

PRAGATI

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CEC

**CAPITAL ENGINEERING COLLEGE, KHORDHA.
DEPARTMENT OF MECHANICAL ENGINEERING**

MISSION & VISSION

Vision of CEC

To prepare skilled professionals with innovative, ethical, and entrepreneurial spirit.

Mission of CEC

M-1: Develop Skilled Professionals- Prepare individuals to excel in evolving global industries through training, hands-on experience, collaboration with industries, and continuous learning.

M-2: Promote Innovation- Encourage creative problem-solving through hands-on research and real-world projects.

M-3: Build Ethical Leaders- Instill integrity, inclusivity, and a commitment to social responsibility in all students.

M-4: Inculcate Entrepreneurial Spirit- Prepare individuals into leaders and entrepreneurs for creating and managing companies.

Vision of Department of Mechanical Engineering (Diploma)

To produce competent mechanical professionals for techno-social needs.

Mission of Department of Mechanical Engineering (Diploma)

M1: Impart quality education through training, practice, industry collaboration and continuous learning.

M2: Promote innovation among students and teachers for addressing global challenges through cutting edge technology.

M3: Nurture professionals with strong ethical values and leadership skills through a blend of academic and extracurricular initiatives.

MECHANICAL ENGINEERING DEPARTMENT

Fostering Innovation, Collaboration, and Knowledge Sharing

Editorial Board Structure

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CONCEPTUALIZED BY:
MR. RASHMI RANJAN PANDA
HOD, MECHANICAL ENGG. DEPT.
CEC

SAROJ KUMAR PARIDA
MECHANICAL ENGG. DEPT.
CHIEF EDITOR

DEBANANDA BEHERA
MECHANICAL ENGG. DEPT.
EDITOR



Amulya Nayak
EDITOR, 3RD YEAR

Bibhuti Bhusan Tripathy
EDITOR, 3RD YEAR

Biswajit Subudhi
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Balaram Sahu
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FROM THE HOD'S PEN



Dear Readers,

It is with great pride and enthusiasm that I present to you the **Volume-4, Issue-1 (2024-25)** of "**Pragati Yantra**", the annual magazine of the **Department of Mechanical Engineering** at **Capital Engineering College (CEC)**. This magazine serves as a platform to showcase the academic excellence, research innovations, and technical achievements of our students and faculty members.

As we step into another year of academic and professional growth, the field of Mechanical Engineering continues to evolve with groundbreaking advancements in Automation, Smart Materials, Additive Manufacturing, Renewable Energy, and Artificial Intelligence-driven design processes. At CEC, we are dedicated to equipping our students with technical knowledge, problem-solving skills, and industry-relevant expertise that will enable them to thrive in this rapidly changing engineering landscape.

This edition of Pragati Yantra is a reflection of our department's commitment to innovation, research, and practical applications. The contributions of our students and faculty members in the form of articles, projects, case studies, and research insights highlight their passion for engineering and their drive to make

As we move forward, let us continue to push the boundaries of knowledge, embrace new technologies, and contribute towards a sustainable and technologically advanced future.

Wishing you all a successful and innovative year ahead!

Thanks & Regards,

Mr. Rashmi Ranjan Panda,

HOD, Dept. of Mechanical Engineering,

CEC, Khordha

FROM THE EDITOR'S PEN



Greetings from Department of Mechanical Engineering

Dear Readers,

It gives me great pleasure to present the first issue of *Pragati Yantra*. This magazine marks the beginning of an exciting journey into the world of digital media. I am eager to witness the remarkable contributions our students will make in the coming years and look forward with anticipation to this year's highlights ones that will provoke thought, bring joy, and offer glimpses into who we truly are.

Campus magazines are invaluable, not only for capturing the essence and energy of the present but also for serving as a time capsule that future generations can revisit. I am delighted that *Pragati Yantra* is curating literary pieces and reviews showcasing the major contributions of the CEC department.

This magazine is truly by the students, of the students, and for the students, fostering their creative expression.

I extend my heartfelt gratitude and congratulations to everyone who contributed articles to spread knowledge and to all those who poured their passion and effort into making this initiative a grand success.

Thanks & Regards,

Saroj Kumar Parida,

Dept. of Mechanical Engineering,

PRAGATI YANTRA

Contents



01

Faculty Articles

02

Student Articles

03

Mechcultura

04

Engiquest



Role of Robotics in Disaster Management

by Rakesh Kumar Sahu

Disaster management is a critical field where robotics plays an increasingly significant role. Natural disasters such as earthquakes, floods, and wildfires, along with man-made catastrophes like industrial accidents, require rapid response and efficient rescue operations. Robotics offers solutions that enhance efficiency, safety, and effectiveness in disaster response and recovery.

One of the primary applications of robotics in disaster management is search and rescue. Autonomous robots equipped with thermal imaging cameras, sensors, and artificial intelligence can navigate hazardous environments to locate survivors. For example, drones can provide real-time aerial imagery, identifying people



trapped in debris or flooded areas. Ground robots, such as snake-like robots, can penetrate through narrow crevices in collapsed structures, ensuring a higher likelihood of survivor detection.

Additionally, robots are being deployed for disaster mitigation and recovery. Unmanned vehicles can clear debris, transport supplies, and restore communication infrastructure in affected areas. Robotic exoskeletons assist first responders by enhancing their physical capabilities, reducing fatigue, and improving efficiency. Furthermore, artificial intelligence and machine learning are being integrated into robotics to improve decision-making and response strategies.

Despite significant advancements, challenges remain in the widespread implementation of robotics in disaster management. Power supply constraints, adaptability to unpredictable environments, and real-time decision-making complexities are areas of ongoing research. Future developments will focus on improving autonomous capabilities, reducing costs, and increasing accessibility to disaster response teams worldwide.

The role of robotics in disaster management continues to evolve, with engineers and researchers pushing technological boundaries. As innovation progresses, robotics will become an indispensable tool in minimizing disaster impact and saving lives worldwide.

Smart Grids and Mechanical Integration

by Saroj Kumar Parida

The concept of smart grids has transformed the energy sector, integrating advanced technologies to enhance efficiency, reliability, and sustainability. Mechanical engineering plays a vital role in the integration of smart grids by developing robust mechanical systems for energy storage, transmission, and distribution.



Smart grids incorporate automation, real-time monitoring, and predictive maintenance to optimize energy consumption. One of the key mechanical components in smart grids is energy storage systems.

Another crucial aspect of mechanical integration in smart grids is the development of resilient power transmission systems. High-voltage direct current (HVDC) transmission lines reduce energy losses and improve efficiency. Additionally, smart transformers with mechanical cooling systems ensure optimal performance and longevity. Mechanical engineering also contributes to the sustainability of smart grids by incorporating renewable energy sources. Wind turbines and hydroelectric systems require precise mechanical design for optimal efficiency. Furthermore, mechanical engineers are involved in developing smart sensors and actuators for real-time grid monitoring, ensuring stable power supply and demand management. Challenges in smart grid implementation include infrastructure costs, system interoperability, and cybersecurity concerns. However, advancements in mechanical engineering and digital technologies are addressing these challenges, paving the way for a more resilient and adaptive energy infrastructure. Smart grids represent the future of energy management, and mechanical engineering is at the forefront of their development. As technology evolves, the integration of mechanical systems with smart grids will continue to enhance energy efficiency and sustainability worldwide.

Mechanical Engineering in Healthcare Devices

by Sidharth Pradhan

The field of healthcare is witnessing rapid advancements driven by mechanical engineering. From prosthetics to diagnostic equipment, mechanical engineers contribute significantly to developing cutting-edge medical devices that improve patient care and treatment outcomes.

One of the most notable contributions of mechanical engineering to healthcare is in the development of prosthetic limbs. Modern prosthetics are designed with lightweight materials, advanced joint mechanisms, and motorized components that mimic natural movement. Bionic limbs integrated with sensors and actuators allow for real-time responsiveness, enhancing mobility and comfort for amputees.

Medical imaging devices such as MRI and CT scanners rely on precise mechanical components for optimal functionality. Rotating gantries, high-speed motors, and precision bearings ensure accurate imaging and diagnosis. Additionally, robotic-assisted surgery is revolutionizing medical procedures by providing high precision, reduced invasiveness, and shorter recovery times.

Another crucial area of mechanical engineering in healthcare is the development of wearable medical devices. Smart wearables, such as continuous glucose monitors and heart rate sensors, incorporate micro-mechanical components to provide real-time health data. These devices enhance preventive healthcare by enabling early detection of medical conditions.

Despite these advancements, challenges remain in ensuring affordability, accessibility, and regulatory compliance. Engineers are continuously working on improving materials, reducing costs, and enhancing the reliability of medical devices. The future of healthcare will see further integration of mechanical engineering, robotics, and artificial intelligence to develop more advanced and patient-centric medical solutions.

Vehicle Dynamics and Control Systems

by Nalinikanta Swain

Vehicle dynamics and control systems play a pivotal role in modern automotive engineering, enhancing safety, performance, and efficiency. The study of vehicle dynamics involves understanding the forces and motions acting on a vehicle, while control systems ensure stability and responsiveness during operation.

One of the key aspects of vehicle dynamics is suspension systems. Engineers design adaptive suspension systems that adjust in real-time based on road conditions and driving behavior. Advanced materials and electronic control units (ECUs) enable smoother rides, improved handling, and increased passenger comfort.

Braking and traction control systems are essential for vehicle safety. Anti-lock braking systems (ABS) and electronic stability control (ESC) prevent skidding and enhance vehicle stability during emergency maneuvers. These systems rely on real-time sensor data and actuators to make precise adjustments, ensuring driver safety.

Modern control systems also include autonomous vehicle technology. Advanced driver-assistance systems (ADAS) utilize sensors, cameras, and AI algorithms to provide features like lane-keeping assist, adaptive cruise control, and automatic emergency braking. Mechanical engineers play a vital role in integrating these technologies into vehicle designs, ensuring optimal performance and reliability.

As automotive technology evolves, challenges such as energy efficiency, cybersecurity, and regulatory compliance need to be addressed. Future advancements in vehicle dynamics and control systems will focus on autonomous driving, electric vehicle optimization, and sustainable transportation solutions.

Corrosion Prevention in Mechanical Structures

by Debananda Behera

Corrosion is a major challenge in mechanical structures, leading to material degradation, structural failure, and increased maintenance costs. Preventing corrosion is crucial in industries such as aerospace, automotive, and infrastructure development.

One of the primary methods of corrosion prevention is material selection. Corrosion-resistant alloys, stainless steels, and composites are commonly used to enhance durability. Engineers also apply protective coatings, such as galvanization and polymer coatings, to prevent environmental damage.

Cathodic protection is another widely used technique. This involves applying a sacrificial anode to prevent metal oxidation. This method is commonly used in pipelines, ship hulls, and offshore structures.

Environmental control measures, such as humidity regulation and controlled ventilation, also help mitigate corrosion risks. Additionally, advanced monitoring systems equipped with sensors detect early signs of corrosion, allowing for timely maintenance and repairs.

Future research focuses on developing self-healing materials and nanotechnology-based coatings for enhanced corrosion resistance. As industries continue to evolve, corrosion prevention remains a critical area of study in mechanical engineering, ensuring long-term structural integrity and sustainability.

STUDENT ARTICLE



Introduction to CAM (Computer-Aided Manufacturing)



by Badal Kumar Mallick, 3rd Semester

Computer-Aided Manufacturing (CAM) is revolutionizing the production landscape by integrating digital tools into manufacturing processes. CAM systems use computer software and machinery to automate, control, and manage manufacturing operations. Industries like automotive, aerospace, and consumer goods benefit from CAM's precision and efficiency.

One of the primary advantages of CAM is its ability to produce complex and intricate designs with high accuracy. Traditional manufacturing processes often face challenges in achieving consistency, but CAM minimizes human error and increases repeatability. Another benefit is the optimization of material usage, reducing waste and improving cost-effectiveness.

The integration of CAM with Computer-Aided Design (CAD) software allows engineers to develop 3D models and directly convert them into machine instructions. This streamlines the workflow from design to production. Additionally, CAM supports various manufacturing techniques such as CNC machining, laser cutting, and additive manufacturing, making it a versatile tool in modern engineering. As industries continue to evolve, CAM is expected to play a crucial role in enhancing efficiency and sustainability in manufacturing. The adoption of smart manufacturing and Industry 4.0 further amplifies the capabilities of CAM, ensuring that future engineers remain at the forefront of technological advancements.



Principles of Renewable Energy Harvesting



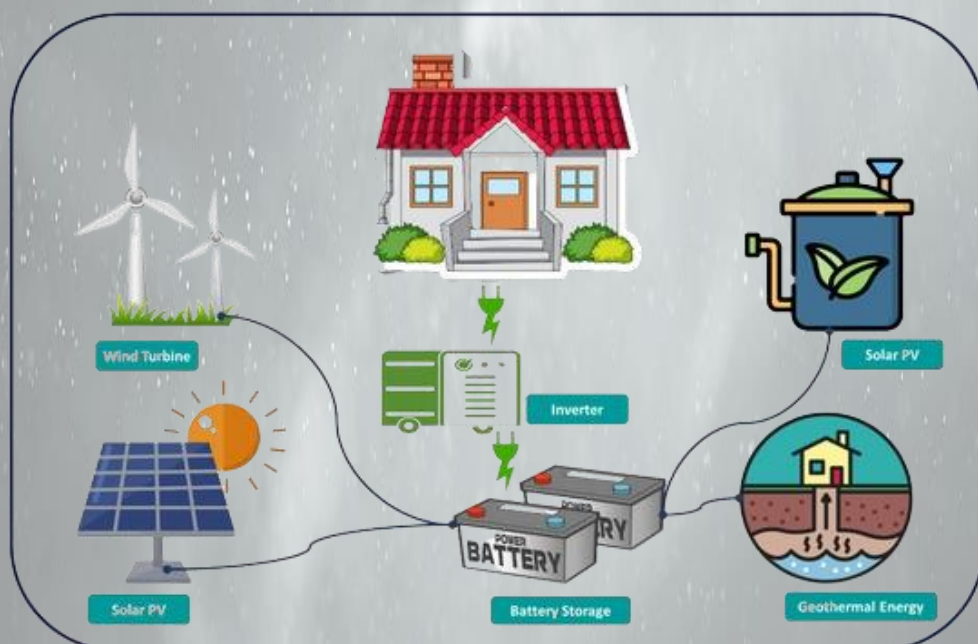
by Bapi Baskey, 1st Semester

Renewable energy harvesting is a key solution for meeting global energy demands while reducing environmental impact. It involves capturing and converting natural energy sources such as solar, wind, hydro, and geothermal into usable power.

Solar energy is one of the most widely harnessed renewable sources. Photovoltaic (PV) cells convert sunlight into electricity, making solar panels a popular choice for residential and industrial applications. Wind energy is another significant contributor, where turbines transform kinetic wind energy into electrical power. Hydroelectric power plants, utilizing the energy of flowing water, have long been a reliable source of renewable energy.

A fundamental principle of renewable energy harvesting is efficiency optimization. Energy losses due to transmission, storage, and conversion processes are minimized through advanced technologies. Battery storage solutions, such as lithium-ion and solid-state batteries, play a critical role in ensuring consistent energy supply even when sources are intermittent.

With increasing concerns about climate change and depleting fossil fuels, renewable energy harvesting is more important than ever. Engineers continue to innovate in this field, developing new materials and systems to improve energy efficiency and integration. The future of sustainable power generation depends on advancements in renewable energy harvesting, making it an essential area of study for mechanical engineers.



The Future of Mechanical Engineering Technologies



by Happy Mallick, 3rd Semester

Mechanical engineering is undergoing a rapid transformation due to technological advancements. Emerging fields such as artificial intelligence (AI), robotics, and sustainable materials are reshaping the industry.

One major trend is automation and smart manufacturing, which improves production efficiency and reduces costs. AI-driven predictive maintenance in machinery helps prevent failures and enhances equipment lifespan. Robotics, particularly in industrial settings, increases precision and productivity.

Another exciting development is the use of advanced materials like carbon fiber composites and shape-memory alloys. These materials improve performance in aerospace, automotive, and biomedical applications. Additionally, additive manufacturing (3D printing) is enabling the creation of complex structures with reduced material waste.

Sustainability is also a driving force in mechanical engineering.

Engineers are developing energy-efficient systems and exploring alternative energy sources to reduce environmental impact. Green technologies, such as wind turbines and electric vehicles, are gaining prominence.

and electric
prominence.

As the industry evolves, mechanical engineers must adapt to new tools and methodologies. Continuous learning and interdisciplinary collaboration will be essential to drive innovation and address global challenges.

engineers must
Continuous



Thermal Insulation Techniques in Industry

by Anil Behera, 5th Semester

Thermal insulation plays a vital role in industrial applications by reducing energy consumption, improving efficiency, and ensuring safety. Various insulation materials and techniques are employed to minimize heat loss or gain, making processes more sustainable and cost-effective. One of the most commonly used insulation materials is fiberglass, which provides excellent thermal resistance. Other materials, such as mineral wool, polyurethane foam, and aerogels, are also widely used due to their insulating properties. Selecting the right material depends on factors such as temperature range, environmental conditions, and cost. Industrial insulation techniques include blanket insulation, spray foam insulation, and reflective insulation. Blanket insulation, often used in piping and equipment, involves wrapping materials around components to maintain temperature stability. Spray foam insulation, applied as a liquid that expands into a solid, is effective in filling gaps and providing an airtight seal. Reflective insulation, used in high-temperature applications, reflects radiant heat to maintain optimal temperatures.

Effective thermal insulation leads to reduced energy consumption, lower operational costs, and enhanced equipment longevity. As industries strive to achieve sustainability, innovations in insulation materials and techniques continue to improve performance and efficiency.



3D Printing and Its Applications **in Engineering**



by Parameswar Sanangi, 3rd Semester

3D printing, also known as additive manufacturing, has transformed engineering by enabling rapid prototyping and complex component production. This technology constructs objects layer by layer from digital models, reducing material waste and allowing for intricate geometries. The key advantages of 3D printing is its flexibility. Engineers can quickly test prototypes, iterate designs, and produce custom parts without the constraints of traditional manufacturing methods. Industries such as aerospace, healthcare, and automotive benefit from 3D printing's ability to create lightweight and high-strength components.

Materials used in 3D printing include polymers, metals, and ceramics. Advancements in material science are expanding the possibilities of additive manufacturing, leading to stronger and more durable parts. Additionally, hybrid manufacturing techniques that combine 3D printing with traditional machining further enhance efficiency.

As 3D printing technology continues to evolve, its applications in mechanical engineering will grow. From on-demand spare parts production to complex biomimetic designs, additive manufacturing is shaping the future of engineering and manufacturing.



Additive Manufacturing for **Small-Scale Production**



by Sibasundar Das, 3rd Semester

Additive Manufacturing (AM), commonly known as 3D printing, is revolutionizing the way small-scale production is approached in the mechanical engineering field. Unlike traditional subtractive manufacturing methods, which involve cutting away material, AM builds components layer by layer using materials like polymers, metals, and ceramics. Small-scale production benefits significantly from AM due to its cost-effectiveness, reduced material waste, and flexibility in design changes. This makes it ideal for prototyping, low-volume manufacturing, and custom part production. Industries such as aerospace, automotive, and healthcare have already integrated AM to produce lightweight and complex components that would be challenging to manufacture through conventional processes. Despite its advantages, AM faces challenges such as limited material properties, slower production speeds compared to mass manufacturing, and higher initial costs for specialized equipment. However, continuous advancements in printing technology and material development are gradually overcoming these limitations. As research in this field progresses, AM is expected to become an essential tool for modern manufacturing, providing engineers with innovative solutions for efficient and sustainable production.



Welding Technologies:

An Introduction



by Bibhudutta Khatua, 3rd Semester

Welding is one of the most critical processes in manufacturing and construction, enabling the joining of metals to create strong and durable structures. Various welding techniques exist, including Arc Welding, MIG (Metal Inert Gas) Welding, TIG (Tungsten Inert Gas) Welding, and Laser Welding. Each method has unique advantages depending on the materials and applications.

One of the primary benefits of welding is its ability to create permanent joints that can withstand extreme conditions. It is widely used in industries such as automotive, shipbuilding, and aerospace. Modern welding technologies are continuously evolving, incorporating automation and robotics to improve precision, efficiency, and safety.

However, welding also presents challenges, including heat distortion, material compatibility issues, and safety hazards due to high temperatures and harmful fumes. Engineers and technicians must follow strict safety protocols and use protective equipment to mitigate these risks.

With advancements in laser welding and friction stir welding, industries can now achieve stronger and more precise welds with minimal defects. As technology progresses, welding continues to play a crucial role in manufacturing, offering innovative solutions for constructing robust mechanical systems.



Basics of Power Plant Engineering



by Manas Mallick, 5th Semester

Power plants are essential facilities that generate electricity to meet global energy demands. The field of power plant engineering focuses on the design, operation, and maintenance of various types of power generation systems. The most common types include thermal power plants, hydroelectric plants, nuclear power plants, and renewable energy systems like solar and wind farms.

Thermal power plants, which burn fossil fuels such as coal, oil, and natural gas, remain the most widely used form of power generation. However, concerns over environmental impact and sustainability have led to increased research in cleaner energy sources. Hydroelectric power plants harness the energy of flowing water, while nuclear plants use controlled nuclear reactions to produce heat and generate electricity.

Efficiency and reliability are critical factors in power plant engineering. Engineers work to improve fuel efficiency, reduce emissions, and develop advanced monitoring systems for better performance. As the world shifts toward renewable energy, power plant engineers are at the forefront of designing innovative solutions for a sustainable future.



Boiler Technology and Its Applications

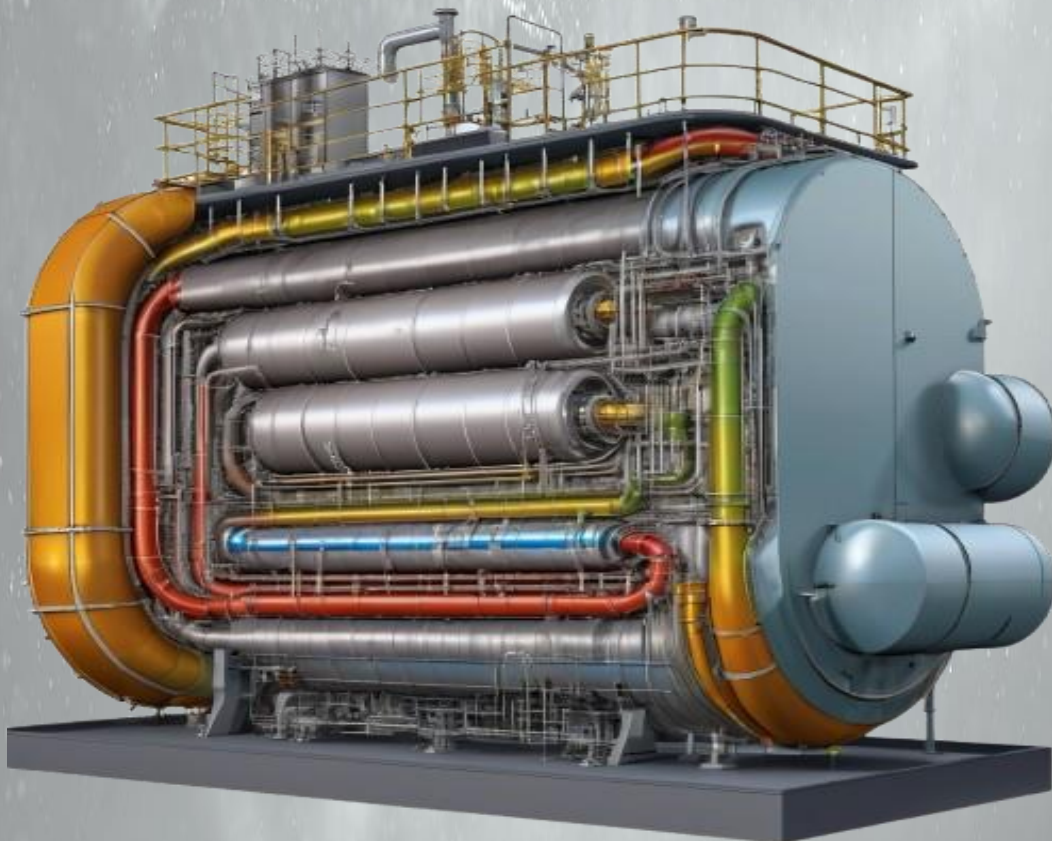
by Subham Jena, 5th Semester

Boilers are fundamental components in power plants and industrial processes, serving as the primary source of steam generation. They operate by heating water to produce steam, which is then used for power generation, heating, and various industrial applications.

Different types of boilers exist, including fire-tube boilers, water-tube boilers, and supercritical boilers. Each type has distinct advantages, with water-tube boilers being more suitable for high-pressure applications and fire-tube boilers being simpler in design and maintenance.

Efficiency in boiler technology is a key focus area, with engineers working to reduce fuel consumption and emissions. The integration of automation and advanced control systems has enhanced boiler performance, improving safety and reducing operational costs.

Boilers play a significant role in industries such as food processing, chemical production, and power generation. As technology advances, researchers continue to develop high-efficiency, low-emission boiler systems to meet the growing energy demands while minimizing environmental impact.



Industry 4.0: The Fourth Industrial Revolution in Manufacturing

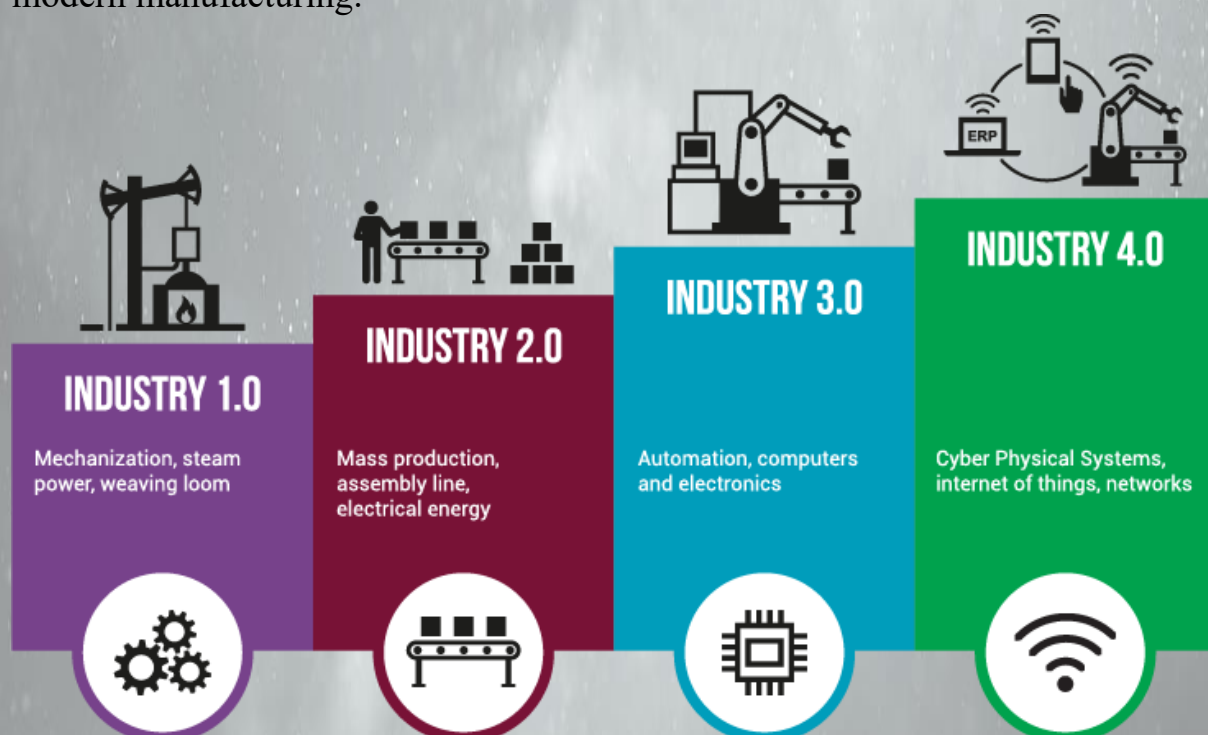


by Niranjan Rana, 5th Semester

Industry 4.0 represents the latest transformation in manufacturing, integrating smart technologies such as artificial intelligence (AI), the Internet of Things (IoT), and automation. This revolution aims to create highly efficient, data-driven manufacturing environments that enhance productivity and reduce operational costs.

One of the core aspects of Industry 4.0 is the use of connected systems that allow machines to communicate and optimize production processes in real time. Smart factories leverage automation, robotics, and cloud computing to streamline manufacturing operations and improve quality control.

Despite its numerous advantages, the adoption of Industry 4.0 faces challenges such as high implementation costs, cybersecurity risks, and the need for skilled professionals to manage advanced systems. However, as more industries embrace digital transformation, the benefits of increased efficiency, reduced downtime, and improved decision-making capabilities make Industry 4.0 a crucial aspect of modern manufacturing.



Advances in Composite Materials for Mechanical Systems



by Hitesh Kumar Choudhury, 3rd Semester

Composite materials are revolutionizing mechanical engineering by offering lightweight, high-strength alternatives to traditional metals. These materials, composed of two or more distinct substances, provide enhanced mechanical properties and are widely used in aerospace, automotive, and structural applications.

Common composite materials include carbon fiber-reinforced polymers (CFRP) and glass fiber-reinforced polymers (GFRP). These materials offer superior strength-to-weight ratios, corrosion resistance, and flexibility in design. Engineers use composites to manufacture lightweight components that improve fuel efficiency and structural performance.

Challenges such as high manufacturing costs and complex recycling processes remain barriers to widespread adoption. However, ongoing research in nanocomposites and bio-composites is addressing these issues, paving the way for more sustainable and cost-effective solutions.

With continuous advancements, composite materials are set to play a crucial role in the future of mechanical engineering, enabling the development of more efficient and innovative mechanical systems.



Casting Processes in Manufacturing



by Bisworanjan Pradhan, 5th Semester

Casting is a fundamental manufacturing process that involves pouring molten material into a mold to create a desired shape. It is widely used for producing complex components in automotive, aerospace, and industrial applications.

There are various casting methods, including sand casting, investment casting, die casting, and centrifugal casting. Each technique offers unique advantages depending on the required precision, material properties, and production volume.

Casting provides cost-effective mass production and allows for the creation of intricate designs that would be difficult to achieve with machining processes. However, challenges such as porosity, shrinkage defects, and mold degradation require careful process control and quality assurance measures.

Advancements in 3D-printed molds and computer-aided design (CAD) have significantly improved casting efficiency and precision. As technology progresses, casting continues to be a vital process in modern manufacturing, offering innovative solutions for complex component production.



Design Optimization for Lightweight Structures

by Ranjan Kusum, 5th Semester

In mechanical engineering, optimizing designs for lightweight structures is crucial for improving efficiency, reducing material usage, and enhancing performance. Lightweight structures are essential in industries such as aerospace, automotive, and robotics, where weight reduction translates to better fuel efficiency and operational effectiveness.

Engineers employ various optimization techniques, including topology optimization, material selection, and advanced manufacturing processes such as additive manufacturing. Composite materials and high-strength alloys play a vital role in achieving lightweight yet robust structures.

Challenges in lightweight design include maintaining structural integrity while minimizing weight and balancing cost-effectiveness. Computational tools like finite element analysis (FEA) help engineers simulate and refine designs before production.

As research advances, lightweight structures will continue to drive innovations in engineering, leading to more efficient and sustainable mechanical systems.



Mechultura

Mechanical Poem

Rhythm of the Machines

@The Heart of Machines@

With gears that turn and engines roar,
Mechanical wonders, we explore.
Bridges strong and turbines high,
Lifting dreams into the sky.

Pistons dance in perfect rhyme,
Clockwork ticking, marking time.
Bolts and beams in structures stand,
Built with skill and steady hand.

Metals forged in fiery glow,
Power plants that ever flow.
Casting, welding, shaping steel,
Crafting marvels, strong yet real.

Through force and motion, torque and speed,
We meet the world's advancing need.
From tiny screws to mighty trains,
Precision runs within our veins.

A field of wonder, vast and grand,
Innovation at our hand.
Mechanical minds, so bold, so free,
Driving forth technology!



Anil Kumar Nayak

ଯନ୍ତ୍ର ଜଗତର କାହାଣୀ, ମେକାନିକାଲ ର ସୁନାମୀ।
ପାଇପ, ଗିଅର, ଏବଂ ଟଙ୍କା, ତଳେ ଲଗି ନିରନ୍ତର ମଙ୍କା।

ଶକ୍ତି ଏବଂ ଗତି ଏଠି ଏକ, ଭାଷା ଯେଉଁଠି ହୁଏ ଏକା।
ତାପ ଏବଂ ଚାପ ଯେଉଁଠି ଗଣା, ଯନ୍ତ୍ର ଜଗତ ତାହା ଅନ୍ତରଣା।

ମେକାନିକାଲ ହେଉ ନୂଆ ଚିନ୍ତା, ଉନ୍ନତିରେ ରହିବୁ ଅଗ୍ରସର ମନ୍ତ୍ରୀ।
ଯନ୍ତ୍ର ନିର୍ମାଣ ନେଇ ଦିନ ରାତି, ଦୁନିଆ କୁ ଦେଉ ନୂଆ ଗତି।



Sagar Behera

ବେଲାରୀ ଏବଂ ଶାଫ୍ଟ ଥିବା,
ଟଙ୍କା ହେଉ କି ଇଞ୍ଜିନ୍ ରେ ଲଗା।
ଉତ୍ସାହ ଦିଏ ଏହି ନୂଆ ବିଚାର,
ଯନ୍ତ୍ର ନିର୍ମାଣର ଏକ ନୈଆ ଅପାର।



**Krushnachandra
Pradhan**

ପିସ୍ତୁନ ଉଠେ ନାମେ, ଶକ୍ତି ଉତ୍ପନ୍ନ କରେ,
ଏହା ଦ୍ଵାରା ଗାଡ଼ି ଗତିରେ ଚଳେ।
ଏହି ଶକ୍ତିର ଲିଳା ବଡ଼ ଅଜବ,
ମେକାନିକାଲ ଜଗତ ଏହା ମହାଜ୍ଞମ!

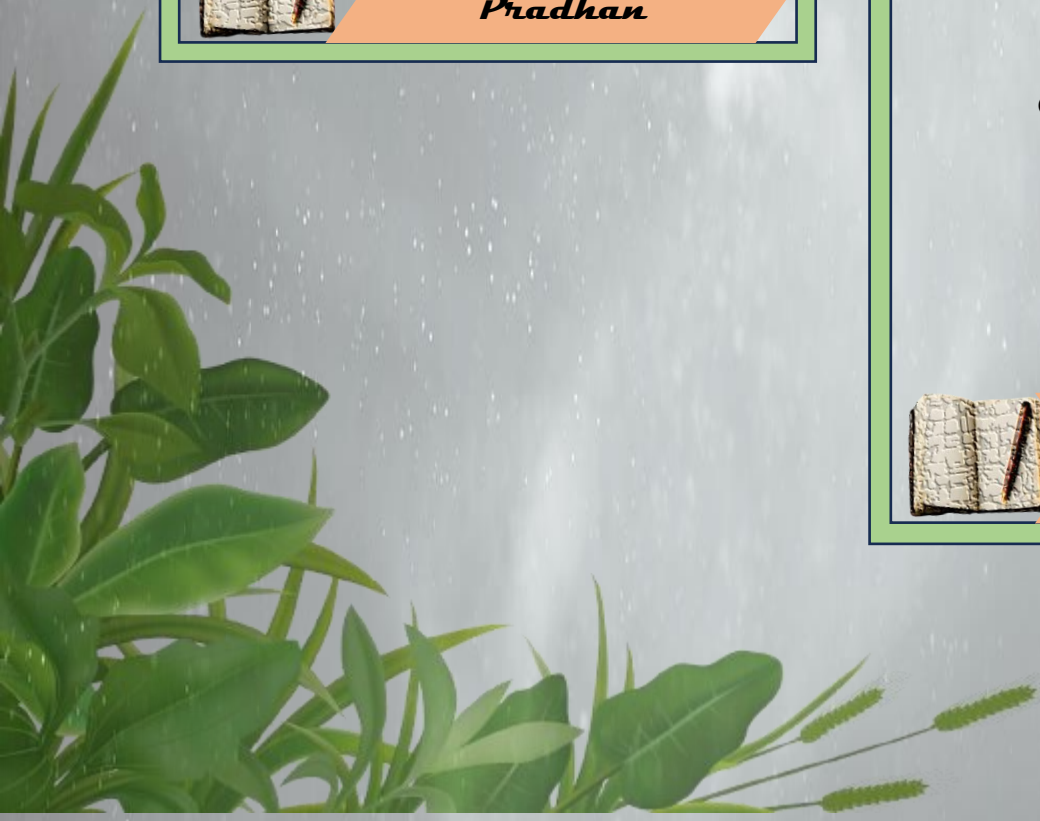


Amar Subudhi

ଯନ୍ତ୍ର ଗୁଡ଼ିକ ତଳେ ନିରନ୍ତର,
ଏଠି ଶ୍ରମିକଙ୍କ ହସ ଥାଏ ଧର।
ଗିଅର ଘୁରେ, ପିସ୍ତୁନ ଚାଲେ,
ମେକାନିକାଲ ହେଉ ସବୁଠି ଜାଲେ।



Subrata Parida



Paintings



Suvanjeet
Samantaray



Tapan Kumar Jena



Mechanical Engineering Department

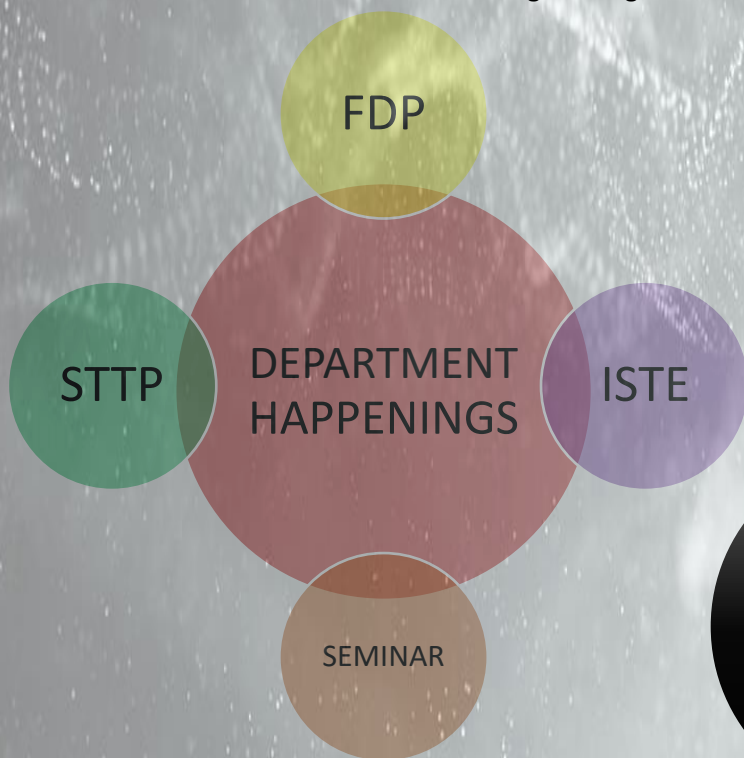
A Year of Innovation and Progress

The Mechanical Engineering Department has once again proven to be a hub of innovation, excellence, and technological advancements. The academic year 2024-25 was marked by groundbreaking research, industry collaborations, and skill-enhancing initiatives that shaped the future of our students.

From hosting technical seminars and workshops to participating in national-level competitions, our students and faculty have showcased exemplary dedication towards engineering excellence. The department successfully conducted seminars, FDPs, STTP, ISTE Programmes that brought together researchers and industry experts to explore eco-friendly manufacturing solutions.

Furthermore, our association with **Digital Skill Odisha** has empowered students with digital skills, preparing them for emerging industry trends.

With an unwavering commitment to academic rigor and practical learning, the Mechanical Engineering Department continues to push the boundaries of knowledge and innovation. As we look forward to another year of achievements, "**Pragati Yantra 2024-25**" stands as a testament to our relentless pursuit of excellence in mechanical engineering.



Operation Management
Outcome-Based Education for
Multidisciplinary Programs: Approaches
and Challenges
Nanotechnology and Functional Materials

Seminar on "3D Printing"
Seminar on National Entrepreneurship Day
Seminar on "Developments and Challenges in Investment
Casting"
Quiz Competition on "Engineers Day"
Teachers Day Celebration
Guest Lecture on "Industry 4.0"

ENGIQUEST



The World's First Engineer

The great **Leonardo da Vinci** (1452-1519) is often considered the first mechanical engineer. His sketches included designs for helicopters, tanks, and even an early version of the car—centuries before they became reality!

Amar Jujharsingh

The Fastest Machine Ever Built

The **Parker Solar Probe**, launched by NASA, is the fastest human-made object, traveling at **over 430,000 mph (700,000 km/h)**. That's fast enough to go from Earth to the Moon in just **40 minutes!**

Anil Behera

Your Car is a Mechanical Marvel!

A standard car engine has over 10,000 moving parts working together. From pistons to crankshafts, each component is meticulously designed to function under extreme heat and pressure.

Aryan Kilaka

Airplanes Fly Due to Mechanical Engineering!

The science behind Bernoulli's Principle (fluid dynamics) is what keeps planes in the air. Thanks to mechanical engineers, millions of people fly safely every day!

Asish Kumar Swain

Vibes: Mechanical Engineering – The Backbone of Innovation!

🔑 "If it moves, thank a mechanical engineer!"

🚀 "We don't just solve problems—we create solutions for the future!"

⚙️ "Give us a lever and a fulcrum, and we'll move the world!"

Debasingh Das

DEPARTMENT OF MECHANICAL ENGINEERING



CAPITAL ENGINEERING COLLEGE,
KHORDHA