Meerut Institute of Engineering & Technology
Meerut
An Autonomous Institute

28 YEAR Excellence

Department of Chemical Engineering

Departmental Magazine 2025

ChemEng World

"Where the World Talks ChemEng"

EDITORIAL BOARD

VISION

To be identified as a center of excellence in the ever-evolving field of Chemical Engineering across the nation, imparting high quality technical education and nurturing talents equipped with high level of professional ethics among the budding graduates of Chemical Engineering

MISION

1. To cater state-of-art technical education at all levels of Chemical Engineering.
2. To nurture talents among the students for achieving brilliance in the core areas of Chemical Engineering and develop leadership skills along with professional ethics.
3. To develop competence through leadership skills and cherish high level of professional ethics for transforming their mind for making them globally

PROGRAM SPECIFIC OUTCOMES

1. Apply the knowledge to identify, formulate and solve the complex problems in the field of chemical engineering and technology.
2. Ensure the safety parameters in industry and sustainability of environment.
3. Design and develop / modify the existing chemical processes to enhance the quality of the product.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

1. To produce graduates who pursue careers as practicing chemical engineers in the field of chemical and allied industries.
2. To produce graduates who demonstrate an ability to design systems, components or processes within realistic constraint such as economic, social, ethical, environmental, health and safety.
3. To produce graduates who pursue advanced studies in chemical engineering and other professional fields.
4. To produce graduates who are capable to communicating effectively in a bilingual setting and to function in multi-disciplinary teams.
5. To produce graduates who assume professional leadership role.
6. To produce graduates who demonstrate a commitment to life-long learning.

MESSAGE FROM CHAIRMAN

Shri Vishnu Saran

Chairman ,
MIET Meerut

Happiness is the key to success. If you love what you are doing, you will be successful."

It is a moment of pride for me that the MIET Chemical Engineering Society is bringing out a new edition of the departmental magazine *ChemEng World*, which aims to highlight the technical insights and creative talents of our students. At MIET, we have always nurtured the spirit of innovation, intellectual curiosity, and technical excellence across all dimensions of learning. The release of this magazine stands as a testament to these values, showcasing the dedication, ingenuity, and hard work of our budding chemical engineers. I extend my best wishes to all students in their academic pursuits and future professional journeys. I also congratulate the entire Chemical Engineering Society team for their commendable effort in launching *ChemEng World* .

MESSAGE FROM VICE CHAIRMAN

Its fills me with great pride and joy to witness the publication of *ChemEng World*, the annual magazine of the Department of Chemical Engineering. This initiative is not just a collection of articles — it is a reflection of our students' creativity, technical brilliance, and passion for innovation. In today's rapidly evolving world, chemical engineers play a vital role in addressing global challenges related to energy, environment, and sustainability. I am delighted to see our students actively engaging in such meaningful academic and creative pursuits that prepare them to become future leaders of the industry and research. I congratulate the entire editorial team, faculty members, and contributors for their dedication and hard work in bringing *ChemEng World* to life. May this magazine continue to inspire every reader to think critically, act responsibly, and innovate fearlessly.

Shri Puneet Agarwal

Vice Chairman,
MIET Meerut

MESSAGE FROM PLACEMENT DIRECTOR

Ms. Akansha Agarwal

Placement Director,
MIET Meerut

"At MIET, we don't just prepare students for jobs; we prepare future leaders ready to make an impact in a dynamic world."

It gives me immense pleasure to extend my best wishes to the Department of Chemical Engineering for publishing this magazine, which reflects the creativity, technical expertise, and achievements of both students and faculty members. The magazine serves as a wonderful platform to showcase the department's academic excellence, research innovations, and entrepreneurial spirit. The Training and Placement Cell have always aimed to bridge the gap between academia and industry by organizing workshops, internships, industrial visits, and expert sessions. I am proud of the consistent efforts made by our students and faculty in enhancing employability skills and achieving remarkable placement outcomes each year.

MESSAGE FROM DESK OF DIRECTOR

Prof. (Dr.) Sanjay Kr. Singh

Director,
MIET Meerut

"The future belongs to those who believe in the beauty of their dreams."

MIET fosters a vibrant intellectual and creative environment that transforms young minds into responsible and progressive citizens of the nation. It is a moment of immense pride and joy that the MIET Chemical Engineering Society is launching its departmental magazine *ChemEng World*. I sincerely appreciate the enthusiasm and initiative of the students of Chemical Engineering in bringing out this magazine. May this endeavor inspire innovation, spark curiosity, and continue to grow in strength and purpose in the times ahead.

MESSAGE FROM DEAN (ACADEMICS)

It gives me immense pleasure to extend my heartfelt congratulations to the Department of Chemical Engineering for publishing its annual magazine, *ChemEng World*. This magazine serves as an excellent platform for students to showcase their intellectual curiosity, innovative ideas, and academic achievements. In an era driven by technological advancement and sustainability, it is heartening to see our young engineers exploring the depth of chemical sciences with such enthusiasm and creativity. *ChemEng World* reflects the vibrant spirit of our students and the department's commitment to academic excellence and holistic development. I appreciate the faculty members and the editorial team for guiding and motivating students to present their thoughts and knowledge in such a meaningful way. I am confident that this initiative will continue to inspire many and contribute to the growth of a dynamic academic culture at MIET.

Dr. Sanjeev Singh

Dean Academics,
MIET Meerut

MESSAGE FROM HOD

Dr. Nikesh Kumar

Head, Department of Chemical Engineering, MIET Meerut

It is with great pride and enthusiasm that I present to you the latest issue of *ChemEng World*, the official magazine of the MIET Chemical Engineering Society. In today's rapidly advancing world, it is more important than ever for students, educators, researchers, and industry professionals in the field of Chemical Engineering to stay informed about the latest developments, technologies, and innovations. *ChemEng World* aims to serve as a platform to share knowledge and foster a deeper understanding of this dynamic and impactful discipline. Chemical Engineering today offers one of the broadest ranges of opportunities globally - from energy and environmental solutions to advancements in materials, pharmaceuticals, and sustainable manufacturing. With this in mind, *ChemEng World* is a dedicated effort by the MIET Chemical Engineering Society to expand the knowledge base of its readers and ignite greater interest in the field. I sincerely hope that the exposure this magazine provides inspires curiosity, encourages continuous learning, and spreads awareness within the community and beyond. Wishing all our readers a stimulating and enriching experience with this edition of *ChemEng*

MESSAGE FROM FACUTLY

Education is not just about acquiring knowledge, but about building character and vision. This magazine stands as a testimony to the diverse talents and untapped potential within our campus. May each page inspire you to dream, to create, and to lead with purpose. Let us continue to learn, evolve, and uplift one another.

Dr. Muzaffar Iqbal
Assistant Professor,
Department of Chemical Engineering
Meerut Institute of Engineering and Technology (MIET)

It gives me great pleasure to pen a few words for the Department of Chemical Engineering's magazine. This publication serves as a vibrant platform to showcase the creativity, academic achievements, research endeavors, and extracurricular talents of our students and faculty. Chemical Engineering is a field that stands at the crossroads of innovation, sustainability, and industry. As educators and mentors, we are proud to see our students continually push the boundaries of knowledge—whether through pioneering research, participation in national-level competitions, or internships in leading organizations. Their drive to explore real-world challenges and contribute to society is what truly defines the spirit of our department. The magazine reflects not only academic excellence but also the holistic development we strive to instill in our students. From technical articles and project highlights to cultural expressions and personal reflections, it is a testament to the dynamic and inclusive environment we nurture here.

Dr. Shivangi
Assistant Professor,
Department of Chemical Engineering
Meerut Institute of Engineering and Technology (MIET)

It gives me great pleasure to share a few words about our dynamic and progressive Department of Chemical Engineering. As an Assistant Professor in the Department of Chemical Engineering, I take immense pride in the remarkable achievements and steady growth of our department.

We are dedicated to delivering a strong academic foundation, hands-on research exposure, and meaningful industry collaboration that collectively prepare our students for real-world challenges. Our primary goal is to ensure that our students are not only highly employable but also innovative leaders capable of driving technological advancements in the ever-evolving field of chemical engineering. The department consistently achieves excellent placement outcomes, promotes research-driven learning, and fosters a vibrant, inclusive, and ethically grounded academic culture. We remain committed to nurturing our students into skilled, responsible, and visionary chemical engineers who will contribute significantly to sustainable development and global scientific progress

Dr. Mamleshwar Kumar
Assistant Professor,
Department of Chemical Engineering
Meerut Institute of Engineering and Technology (MIET)

As an Associate Professor, Placement Coordinator, and Research Spokesperson, I take immense pride in our Chemical Engineering Department. We are committed to providing a rigorous academic foundation, hands-on exposure to cutting-edge research, and strong industry collaboration that ensures our students are not just employable, but future-ready. Our department consistently achieves excellent placement records, fosters innovation through research projects, and nurtures a vibrant learning environment where students are mentored to become ethical, skilled, and visionary chemical engineers.

Dr. Rajni Bharti
Associate Professor,
Department of Chemical Engineering
Meerut Institute of Engineering and Technology (MIET)

TABLE OF CONTENTS

ABOUT CHEMICAL ENGINEERING

Introduction

Chemical Engineering is one of the most fascinating and dynamic branches of engineering that combines the principles of chemistry, physics, mathematics, biology, and economics to efficiently use, produce, transform, and transport chemicals, materials, and energy. It bridges the gap between science and industry, turning laboratory discoveries into large-scale industrial processes that benefit society.

From producing everyday essentials like soaps, fuels, and fertilizers to developing cutting-edge materials and clean energy solutions, chemical engineering plays a vital role in shaping modern civilization.

What is Chemical Engineering?

Chemical Engineering deals with the design, development, operation, and optimization of processes that convert raw materials into useful and valuable products. It involves understanding how materials behave, how reactions occur, and how to design safe, sustainable, and efficient systems.

A chemical engineer's job is not limited to chemicals alone — it extends to areas like nanotechnology, biotechnology, food processing, environmental protection, and energy systems.

Core Areas of Chemical Engineering

1. **Thermodynamics** – Understanding energy transformations and equilibrium in chemical systems.
2. **Fluid Mechanics** – Study of fluid flow and pressure drop in pipelines, reactors, and equipment.
3. **Heat and Mass Transfer** – Transfer of heat and materials in industrial processes.
4. **Reaction Engineering** – Kinetics and design of chemical reactors for maximum efficiency.
5. **Process Control and Instrumentation** – Maintaining stability and safety in industrial plants.
6. **Environmental Engineering** – Controlling pollution, waste treatment, and sustainable operations.
7. **Biochemical Engineering** – Using biological processes for product formation like enzymes, vaccines, or biofuels.

Applications of Chemical Engineering

- **Petrochemical and Refining Industry:** Conversion of crude oil into fuels, lubricants, and plastics.
- **Pharmaceuticals:** Designing processes for drug production and purification.
- **Food and Beverage Industry:** Improving preservation, flavor, and packaging techniques.
- **Water Treatment:** Purifying and recycling water to meet environmental standards.
- **Energy Sector:** Production of hydrogen, biofuels, and renewable energy materials.
- **Nanotechnology and Materials:** Developing new materials like graphene, polymers, and composites.
- **Environmental Protection:** Designing eco-friendly processes and reducing industrial emissions.

Role of a Chemical Engineer

Chemical Engineers are problem-solvers who apply scientific principles to design and operate safe, sustainable, and economically viable processes. They ensure that production is efficient, cost-effective, and environmentally responsible.
They work in:

- Design and simulation of processes
- Research and development
- Safety and risk management
- Quality control
- Project and plant management

SCOPE

Agriculture industries

Petroleum industries

Food process industry

Energy sector

Pharmaceuticals industry

Petrochemical industries

Paint industries

Process engineering

Environmental and pollution sector

Nuclear power

Design

OPPORTUNITIES

Agriculture Industry

Chemical engineers develop producing fertilizers enhancing chemical, food processing and optimize process for pesticides and other crop as well as in designing efficient preservation method

Research Scientist

Offers research opportunities in renewable energy, smart materials, and environment innovation

Intellectual Property & Research Patenting

Offers opportunities in intellectual properties and research patenting innovations

Petroleum Industry

Global process of exploring , extracting, refining, transportation and marketing crude oil and their derived products

Production Engineer and Quality Control Analyst

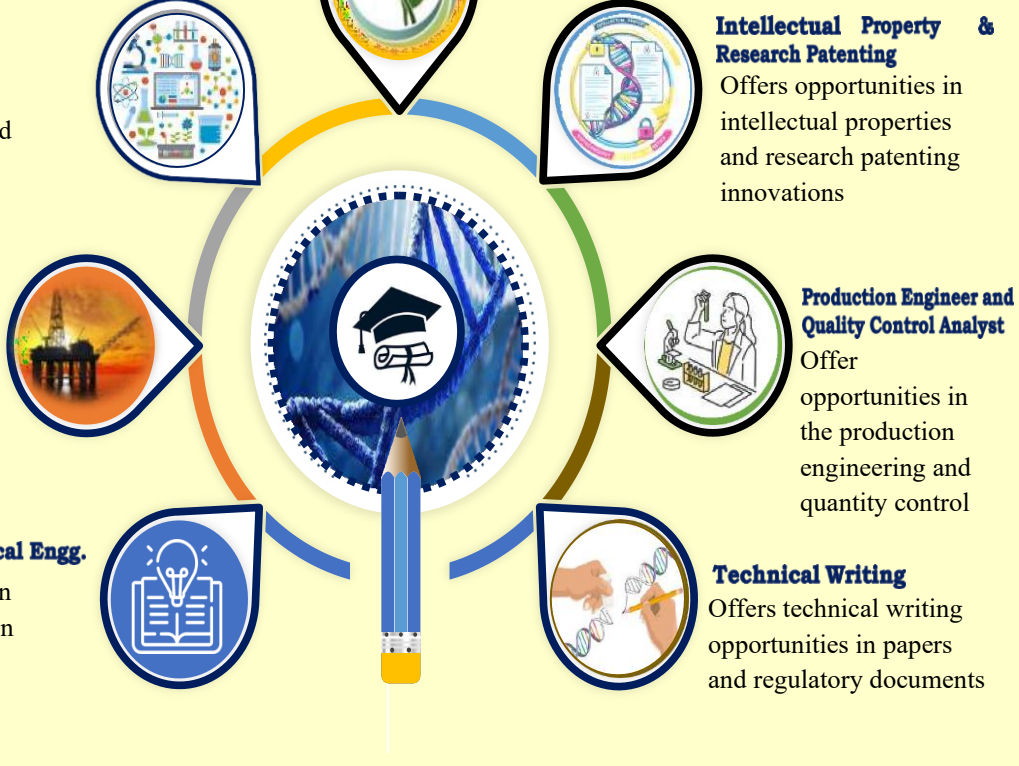
Offer opportunities in the production engineering and quantity control

Master & Doctorate in Chemical Engg.

Advance expertise in biological innovation and research

Technical Writing

Offers technical writing opportunities in papers and regulatory documents



Job Profiles:

- Process Engineer
- Production Engineer
- Design Engineer
- Quality Analyst
- Research Scientist
- Environmental Engineer

Higher Studies:

Students can pursue M. Tech, MBA, or research (Ph.D.) in specialized fields like Energy Engineering, Process Design, or Biochemical Engineering.

Future of Chemical Engineering

The future of Chemical Engineering lies in **sustainability, clean energy, and digitalization**. Modern chemical engineers are working towards:

- **Green Chemistry:** Developing eco-friendly chemical processes.
- **Renewable Energy:** Hydrogen fuel cells, bioenergy, and carbon capture technologies.
- **Artificial Intelligence in Process Design:** Using AI for optimization and smart manufacturing.
- **Circular Economy:** Recycling and reusing resources to reduce waste.

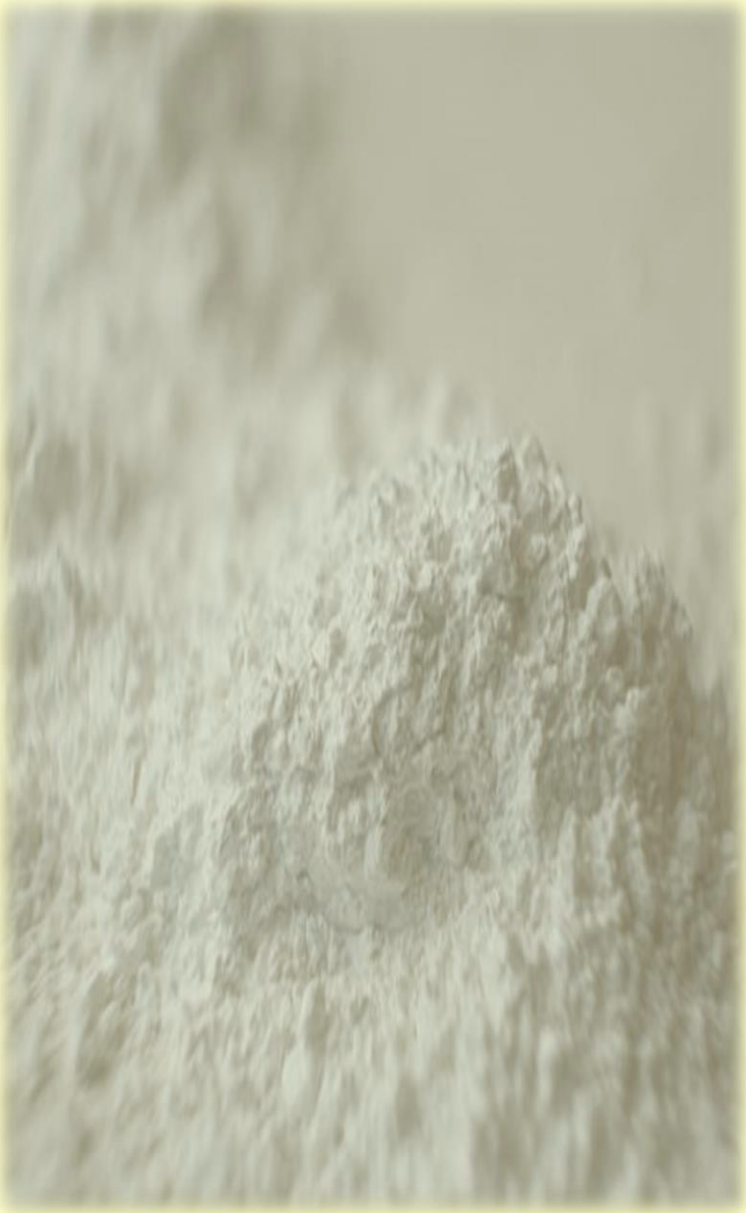
Chemical Engineering is not just about production — it's about **innovation, responsibility, and creating a better world** through science and technology.

Conclusion

Chemical Engineering stands as one of the most versatile and impactful engineering disciplines. It plays a crucial role in addressing the world's major challenges such as energy crisis, environmental pollution, and sustainable development.

The journey of a chemical engineer is one of discovery, creativity, and transformation. As technology advances, the opportunities for chemical engineers continue to expand - making it a career path that is both rewarding and essential for the future.

MANUFACTURE OF CALCIUM CARBONATE (300TPD)



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Batch: 2019-2023

The production of Calcium Carbonate is very predominant aspect of chemical industry. The infrastructure of an industry depends upon the extent manufacturing, consumptions and capacity the plant deals with. The establishment of a production plant captivates various fields. In a diverse plant there are various equipment's with supports, piping, and instruments that are designed as Indian Standard Specifications which are certified and fulfill the safety measures. The most featuring aspects has always been cost incurred with any plant. It varies according to current market status. The features of summing up the project are material balance, energy balance, designing of equipment, site and plant location, safety and hazard. The study of all these features eventually sums up to a realistic view of the project undergoing nowadays.

BIOFUEL PRODUCTION BY ALGAE

Increasing number of populations, advanced technology and economics growth somehow has caused energy depletion. The development of biofuel such as biodiesel, bioethanol and biogas are extremely needed to overcome these crises. Biofuel is derived from biological sources or biomass which are more environmentally friendly, less toxic, reduce greenhouse gas emission and cost less. Algae come from the third-generation product of both biodiesel and bioethanol. Algae based biofuel has various advantages such as non-toxic, does not require fresh water to grow, higher growth rate, biodegradable and non-used arable land. Thus, this review summarizes that production of biofuel from algae seems to be a profitable way to yield biofuel. Finally, further studies are recommended including the chemicals and materials used along with improving the mobilization techniques and processes.

Aparna,
Ashmita Rai,
Kalash Siwach,
Tushar Daksh,
Mohd. Aquib

ABSORPTIVE REMOVAL OF CRESOL RED DYE FROM WASTE-WATER USING MODIFIED ACTIVATED CARBON

In this study, we have investigated the use of agricultural waste (sugarcane bagasse) which is produce in very bulk quantity in the sugarcane industry as an adsorbent for the removal of the Cresol red dye. The efficiency and performance of activated carbon prepared from agricultural waste material, sugarcane bagasse, was evaluated for the removal of cresol red (CR) dye from aqueous solutions. All the experiments were conducted in the batch adsorption mode. Adsorption studies were conducted at the different initial CR dye concentration (60 mg/L, 80 mg/L and 100 mg/L) and solution pH (4, 6, 8, 10 and 12). The percentage removal efficiency was found to be dependent on the initial CR dye concentration. Solution pH played an important role in achieving the higher removal efficiency of dye. The % removal was increased from 14% to % with an increase in the solution pH from 4 to 12. Maximum removal percentage (almost 80%) of CR dye was obtained at the optimum conditions i.e., pH of 12 for an initial concentration of 80 mg/L and adsorbent dose of 1 g/300 ml. Observed results exhibited that the adsorption of CR dye was more favorable under basic medium as compared to acidic medium. Overall, it can be said that the prepared activated carbon may be used for the removal of CR dye from liquid industrial wastes.

Keywords: Adsorption; Wastewater Treatment; Activated Carbon; cresol red dye; Batch studies

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GRASS PAPER : AN ECO – FRIENDLY APPROACH

Grass paper emerges as a sustainable alternative to traditional wood-based paper, made from fast-growing natural grasses such as elephant grass and bamboo grass. Unlike conventional paper, which requires cutting down trees, grass paper helps reduce deforestation, conserve biodiversity, and lower the carbon footprint of paper production. It is versatile, biodegradable, and recyclable, making it suitable for notebooks, books, packaging, and even artistic crafts. The production process also consumes less water and energy, making it an environmentally friendly choice. By adopting grass paper, educational institutions, offices, and industries can contribute to a greener and more sustainable future, showing that small choices in everyday materials can make a big impact on the planet.

Grass paper (An eco-friendly approach)

NANO WORLD: TINY SCIENCE, GIANT POSSIBILITIES

Nanotechnology is one of the most fascinating and rapidly growing fields of science today. It deals with working at the **nanoscale** size so tiny that it is measured in billionths of a meter. At this scale, materials behave in extraordinary ways, often showing properties very different from their larger forms.

Why is Nanotechnology Important?

Nanotechnology has the power to transform our lives. From healthcare to energy, and from electronics to the environment, it is creating solutions for challenges faced by society. Scientists and engineers are constantly discovering new applications that make our future brighter and smarter.

Everyday Applications

- **Medicine**: Doctors use nanoparticles to deliver medicines directly to diseased cells, reducing side effects and improving treatment.
- **Electronics**: Mobile phones, laptops, and other gadgets are becoming smaller, faster, and more powerful thanks to nanotechnology.
- **Energy**: Nanomaterials help make solar panels and batteries more efficient, supporting clean and sustainable energy.
- **Environment**: Nanotechnology is being used to clean polluted water and remove harmful substances.

A Step Toward the Future

Nanotechnology proves that sometimes the smallest things can make the biggest difference. As research continues, we can look forward to a future where this “science of the small” solves big problems and makes life more comfortable, healthy, and sustainable.

Aman Kumar

B.Tech IVth Year (2025-26)

HYDROGEN : FUEL OF THE FUTURE

As the world faces the challenges of climate change and the need for sustainable energy, hydrogen has emerged as one of the most promising alternatives to fossil fuels. Often called the “fuel of the future,” hydrogen is the most abundant element in the universe and, when used as a fuel, produces only water as a by-product, making it a zero-emission energy source. Its potential applications are vast—hydrogen can power vehicles through fuel cells, provide clean energy for industries such as steel and cement, store excess renewable energy from solar and wind, and generate electricity for homes and offices. Countries across the globe are investing heavily in hydrogen technologies, particularly in the production of green hydrogen, which is generated using renewable energy sources. Despite challenges such as high production costs, the need for new infrastructure, and safe storage and transport, hydrogen continues to attract attention as a key solution for a sustainable energy future. With ongoing research, innovations in fuel cell technology, and international collaboration, hydrogen has the potential to not only reduce global carbon emissions but also create new industries, jobs, and opportunities. In the coming decades, hydrogen could transform the way we live, work, and move, bringing us closer to a cleaner, greener, and more sustainable planet.

Sanskriti Yadav

B.Tech IVth Year (2025-26)

WASTE WATER TREATMENT

Wastewater Treatment: Engineering the Future of Clean Water

Water is the foundation of life and industry, yet its purity is continuously endangered by rapid urbanization, industrial discharge, and population growth. **Wastewater treatment** has therefore become one of the most vital engineering processes for achieving environmental sustainability and public health protection.

The treatment of wastewater involves a combination of **physical, chemical, and biological processes** designed to remove contaminants and restore water quality before it is returned to the ecosystem or reused.

The process typically includes three key stages:

- **Primary Treatment:** Removes large solids and suspended materials through screening and sedimentation.
- **Secondary Treatment:** Utilizes microorganisms to biologically degrade dissolved and colloidal organic matter, reducing biochemical oxygen demand (BOD).
- **Tertiary Treatment:** Employs advanced purification methods such as filtration, chlorination, membrane separation, or UV disinfection to eliminate residual pollutants and pathogens.

Modern innovations like **membrane bioreactors (MBRs), reverse osmosis, activated carbon adsorption**, and **constructed wetlands** are revolutionizing the field by improving treatment efficiency and enabling water reuse. These technologies are particularly crucial in regions facing water scarcity, transforming wastewater from a pollutant into a valuable resource.

For chemical engineers, wastewater treatment is not merely a process — it is a **responsibility toward sustainable development**. Through innovation, research, and efficient design, engineers can ensure that industrial growth aligns with environmental preservation, ensuring a cleaner and healthier planet for generations to come.

Rohit Kumar

B.Tech III Year (2025-26)

SOLID WASTE MANAGEMENT IN CHEMICAL INDUSTRIES

The rapid growth of industrialization has brought immense progress to society, but it has also led to the generation of large quantities of solid waste, particularly from chemical industries. Managing this waste effectively is not only essential for environmental protection but also for ensuring sustainable industrial growth.

Solid waste in chemical industries includes a wide variety of materials such as sludge, spent catalysts, filter cakes, packaging materials, and residues from chemical processes. Many of these wastes are hazardous and require careful handling, treatment, and disposal.

Effective **Solid Waste Management (SWM)** in chemical industries involves several crucial steps:

1. **Waste Minimization:**
   Reducing waste at the source through process optimization, raw material substitution, and cleaner production technologies.
2. **Segregation and Collection:**
   Separating hazardous and non-hazardous waste streams ensures safer handling and easier recycling or disposal.
3. **Recycling and Recovery:**
   Reuse of by-products and recovery of valuable materials such as metals, solvents, or catalysts help reduce overall waste volume and cost.
4. **Treatment and Disposal:**
   Chemical, thermal, and biological methods such as incineration, composting, and stabilization are used to neutralize or safely dispose of waste.

Modern industries are adopting **Zero Waste** and **Circular Economy** concepts, aiming to convert waste into useful resources. Techniques like **waste-to-energy conversion** and **co-processing in cement kilns** are gaining attention for their economic and environmental benefits.

For chemical engineers, solid waste management is not just an operational task — it is a **responsibility toward environmental stewardship**. By designing cleaner processes, developing eco-friendly materials, and implementing efficient waste management systems, engineers can lead the way toward a more sustainable and pollution-free industrial future.

"A cleaner industry today means a greener planet tomorrow."

Prerna

B.Tech III Year (2025-26)

CARBON CAPTURE AND STORAGE :COMBATING CLIMATE CHANGE

Carbon Capture and Storage (CCS): Combating Climate Change

The rising concentration of carbon dioxide (CO_2) in the atmosphere is one of the primary causes of global climate change. As industries continue to rely heavily on fossil fuels for energy and production, reducing carbon emissions has become a global priority. One of the most promising technologies addressing this challenge is **Carbon Capture and Storage (CCS)** — a breakthrough approach that combines chemistry, engineering, and environmental science.

CCS involves capturing CO_2 emissions from industrial sources such as power plants, refineries, and cement factories before they are released into the atmosphere. The captured carbon is then **transported and stored safely underground**, preventing its contribution to the greenhouse effect.

The CCS process typically includes three key steps:

1. **Capture:** CO_2 is separated from other gases using chemical solvents (like amines), membranes, or adsorption materials.
2. **Transport:** The purified CO_2 is compressed and moved through pipelines, ships, or tankers to designated storage sites.
3. **Storage:** CO_2 is injected deep into geological formations such as depleted oil and gas fields or deep saline aquifers, where it can remain trapped for thousands of years.

In addition to reducing emissions, CCS can be integrated with **carbon utilization technologies** to produce fuels, plastics, or building materials — transforming waste carbon into valuable resources. This concept is known as **Carbon Capture, Utilization, and Storage (CCUS)**.

However, challenges remain, including high operational costs, energy requirements, and the need for public awareness about safety and long-term monitoring. Ongoing research in **chemical solvents, nanomaterials, and process optimization** aims to make CCS more efficient and economically viable.

For chemical engineers, CCS represents a vital opportunity to lead the global fight against climate change. Through innovation and responsible engineering, we can ensure a sustainable balance between industrial development and environmental preservation.

🌎 **“Capturing carbon today means saving our planet tomorrow.**

Kashish

B.Tech III Year (2025-26)

PERKS OF BEING CHEMICAL ENGINEER

Chemical engineer is a branch of engineering that deals with the design, construction and operation of industrial processes that involves transformation of raw materials. Just like so many overlooked branches of engineering “Chemical Engineering” is also an overlooked one.

The above situation leads to the birth of a pathetic situation in student’s life called “RATE RACE” over top branches. In real life there is no such labelled branches called “ top branches” in B.Tech some stereotypes make people think so. Engineer is someone who resolves societal problems through technical way, and problems have no specific domain they can be from any field (mechanical, chemical, IT) etc. By 2035, the chemical industry going to hold the economic value of $5.6 trillion, Asia will continue to dominate by 62% and the leading sectors are bio-fuels, chemical industry, sustainable development.

In a nutshell, if everyone will participate or run over top branches , then who will going to become the customer so make sure you willnot be the one.

Mahenoor

B.Tech II Year (2025-26)

CARBON BRICK

Carbon Bricks: The Backbone of High-Temperature Chemical Industries

In the world of chemical and metallurgical industries, **carbon bricks** play a crucial role in ensuring safety, durability, and efficiency. These refractory materials are widely used to line furnaces, reactors, and tanks that operate at extremely high temperatures and in corrosive environments.

Carbon bricks are primarily made from high-quality anthracite, coke, or graphite combined with suitable binders such as tar or pitch. After mixing, shaping, and baking at high temperatures, the bricks gain exceptional mechanical strength and thermal stability.

The unique properties of carbon bricks include:

- **Excellent resistance to heat and chemical corrosion**
- **High thermal conductivity and shock resistance**
- **Non-wettability by molten metals and slags**
- **Long service life even under harsh operating conditions**

Because of these characteristics, carbon bricks are extensively used in **blast furnaces, aluminium reduction cells, electrolytic tanks, chemical reactors, and acid storage vessels**. In particular, their resistance to acids makes them ideal for use in **acid-proof linings** within chemical process plants.

With increasing industrial demand for efficiency and sustainability, modern research focuses on improving the performance of carbon bricks through **impregnation techniques, nano-additives, and carbon composites**. These advancements not only enhance strength but also extend the lifespan of industrial equipment — making carbon bricks an essential material for future engineering innovations.

Ayan Siddiqui

B.Tech II Year (2025-26)

DEGRADABLE POLYMERS: SUSTAINABLE ALTERNATIVE OF MODERN PLASTIC

Plastics have become an integral part of modern life — from packaging to construction and healthcare — but their non-degradable nature has created a serious environmental challenge. The accumulation of plastic waste in soil and water bodies has led to pollution, harming ecosystems and human health. To address this growing issue, scientists and engineers have developed **degradable polymers**, an eco-friendly alternative to conventional plastics.

Degradable polymers are materials designed to break down into simpler, non-toxic components under natural conditions such as light, heat, moisture, or microbial activity. These polymers can be broadly classified into:

- **Biodegradable polymers** – which decompose through the action of microorganisms. Examples include **polylactic acid (PLA)**, **polyhydroxyalkanoates (PHA)**, and **polycaprolactone (PCL)**.
- **Photodegradable and Oxidatively degradable polymers** – which degrade when exposed to sunlight or oxygen, respectively.

Unlike traditional plastics derived from petroleum, many degradable polymers are synthesized from **renewable resources** like corn starch, sugarcane, or vegetable oils. This not only reduces dependence on fossil fuels but also lowers greenhouse gas emissions.

However, large-scale adoption of degradable polymers still faces challenges such as **high production cost, limited mechanical strength, and slower degradation under certain conditions**. Continuous research in **biotechnology and polymer engineering** aims to overcome these barriers and make these materials commercially viable.

As the world moves toward sustainability, degradable polymers represent a promising step toward a **cleaner, greener, and more sustainable future** — where innovation meets environmental responsibility.

Harsh Motla

B.Tech II Year (2025-26)

BIOLOGICAL REMOVAL OF IRON WELL AND HANDPUMP WATER

Groundwater is one of the primary sources of drinking water in rural and semi-urban regions of India. However, in many areas, well and handpump water contains **excessive iron**, often exceeding the permissible limit of **0.3 mg/L** set by WHO and BIS standards. High iron concentration not only gives water an unpleasant taste and reddish-brown color but also causes staining of clothes, utensils, and plumbing systems. Prolonged consumption may also lead to health issues.

Traditionally, iron removal from water is achieved through **aeration, filtration, or chemical oxidation**, but these methods can be **expensive, chemical-intensive, and maintenance-heavy**, making them unsuitable for small communities. As a sustainable alternative, **biological removal of iron** has emerged as an efficient and eco-friendly solution.

This process utilizes **iron-oxidizing bacteria (IOB)** such as *Gallionella ferruginea* and *Leptothrix ochracea*, which convert soluble ferrous iron (Fe^{2+}) into insoluble ferric hydroxide ($Fe(OH)_3$). The precipitated iron can then be easily filtered out, resulting in clean and safe water.

The biological system typically involves three main steps:

1. **Aeration:** Oxygen is introduced to promote bacterial growth and oxidation.
2. **Biofiltration:** Water passes through a sand or gravel filter colonized by iron-oxidizing bacteria.
3. **Sedimentation and Filtration:** The formed ferric particles are removed, producing iron-free water.

Compared to chemical methods, **biological iron removal** offers several advantages — lower operational cost, minimal chemical use, and higher efficiency under natural conditions. It is particularly suitable for **rural water supply systems**, where simplicity, sustainability, and affordability are essential.

This nature-inspired technology demonstrates how **biotechnology and environmental engineering** can come together to solve real-world problems.

Harshit Yadav
B.Tech II Year (2025-26)

NANOSCIENCE : THE POWER OF THE INFINITELY SMALL

In the world of science and technology, **Nanoscience** has emerged as one of the most revolutionary fields of the 21st century. It deals with the study and manipulation of materials at the **nanoscale (1–100 nanometers)** — a scale so small that a single human hair is about 80,000 nanometers wide. At this tiny scale, materials exhibit unique **physical, chemical, and mechanical properties**, completely different from their bulk forms.

Nanoscience lies at the intersection of physics, chemistry, biology, and engineering. By understanding matter at the atomic and molecular level, scientists and engineers can create new materials and devices with exceptional capabilities.

Some of the key applications of **nanoscience** include:

- 🧪 **Nanomaterials:** Used in coatings, catalysts, sensors, and advanced composites.
- 💊 **Nanomedicine:** Enables targeted drug delivery, cancer therapy, and imaging at the cellular level.
- ⚙️ **Energy and Environment:** Improves solar cells, fuel cells, batteries, and pollution control systems.
- 💧 **Water Purification:** Nanomaterials like carbon nanotubes and nano-filters remove heavy metals and pathogens effectively.

For **chemical engineers**, nanoscience opens a new era of **process innovation** — designing materials with high surface area, enhanced reactivity, and tailored properties. It allows engineers to create **smarter catalysts**, **stronger materials**, and **cleaner processes** for sustainable development.

However, as with any powerful technology, nanoscience also requires careful consideration of **environmental and health impacts**. Responsible research and ethical application are key to harnessing its full potential safely.

Nanoscience truly represents the **future of modern engineering**, where imagination meets atomic precision, and the smallest structures create the biggest impact on humanity.

✨ **"Think small — achieve big. That's the promise of Nanoscience."**

Akhlad Siddiqui

B.Tech II Year (2025-26)

RESEARCH PAPER PUBLICATION

Experimental investigation on mass transfer coefficient in airlift Reactor involving Boger fluid

Authors: Nikesh Kumar, Renu Gupta , Ajay Bansal, Baneesh Patial

In the realm of aerobic processes, both the average shear rate and mass transfer coefficient play crucial roles, directly influencing the proliferation of microorganisms. Moreover, the behaviour of fluids in biochemical processes may diverge from the typical Newtonian model, thereby impacting the efficiency of airlift reactors. This study delves into the influence of elasticity on the mass transfer coefficient, specifically examining the effects using a Boger fluid comprising glycerol 55% (v/v) and polyacrylamide 0.04% in tap water. Boger fluid is chosen due to the presence of elasticity whereas, its viscosity closely resembling that of a Newtonian fluid composed of glycerol 65% (v/v). The investigation revealed a lower mass transfer coefficient for the Boger fluid compared to both tap water and the glycerol 65% (v/v) solution. Furthermore, an empirical correlation has been proposed to forecast the mass transfer coefficient involving the Boger fluid. The experimental and predicted data comparison demonstrates a strong alignment, with an error margin of approximately ±10%.

Experimental study on impact of viscosity on hydrodynamics in airlift reactor comprising viscous-Newtonian fluids

Authors: Nikesh Kumar, Renu Gupta, Ajay Bansal

Abstract

Airlift reactors are commonly utilized as multiphase contractors in a range of chemical and biochemical industries. Gas-phase holdup, regime transition, bubble diameter and liquid velocity are the important hydrodynamic parameters. Average bubble diameter is most important parameter and plays crucial role in the investigations of hydrodynamic parameters with highly viscous liquid-phase. Further, the viscosity of liquid-phase plays a crucial role in determining the shape of bubbles and the movement of the liquid-phase within both the riser and downcomer sections of airlift reactors. This, in turn significantly impacts the overall performance of the reactors. In this study, the impact of viscosity on hydrodynamic parameters has been elucidated by considering different concentrations of glycerol in the tap water (25–65 % v/v). Viscosity of the fluid shows negative impact on the gas-phase holdup and liquid velocity however; it shows positive impact on bubble diameter. Further, a transition in flow regime from homogeneous to heterogeneous, was observed at lower superficial gas velocity for viscous solutions compared to tap water. In this study, the correlation for gas-phase holdup has been developed by considering the average bubble diameter and key dimensionless numbers, including the Bond, Galilei and Froude numbers. The resulting correlation has been compared with both the current experimental data and existing correlations from the literature. It demonstrates a strong agreement and can be effectively used for the design and scale-up of airlift reactors.

EVENT CONDUCTED

Welcome Orientation for Second-Year Students

The Department of Chemical Engineering organized a Welcome Orientation Program on **19th August 2025** to warmly receive the second-year students as they stepped into a new academic phase. The event aimed to reconnect students with the department and motivate them for upcoming challenges and opportunities. Faculty members shared inspiring words about teamwork, innovation, and professional growth. The program created an energetic atmosphere filled with enthusiasm and a renewed sense of belonging among all students.

Teacher's Day Celebration 2025

The Department of Chemical Engineering celebrated Teacher's Day on **5th September 2025** with great enthusiasm and respect. Students expressed their gratitude towards their teachers through speeches, cultural performances, and heartfelt messages. The event highlighted the invaluable role of teachers in shaping the future of budding engineers. The celebration concluded with a sense of joy, appreciation, and unity among students and faculty members.

War of Wits: Debate Competition 2025

On 16th September 2025, the annual inter-branch debate competition, “War of Wits”, was held, bringing together bright minds from across the campus. The Chemical Engineering Department proudly secured the **2nd position,** with **Mr. Rudraksh** and **Ms. Mahenoor** representing the branch with remarkable skill and confidence. Their eloquence, critical thinking, and teamwork impressed both judges and audience. The event was a celebration of knowledge, expression, and healthy competition, reflecting the spirit of intellectual excellence within the college.

Research Excellence Award: 2025

Research is the cornerstone of innovation and progress in Chemical Engineering. It transforms theoretical knowledge into practical solutions that address real-world challenges in energy, environment, materials, and sustainable development. The Department of Chemical Engineering has always emphasized cultivating a strong research culture among students and faculty, encouraging them to think critically, explore new ideas, and contribute meaningfully to society.

Through collaborative projects, laboratory experimentation, and interdisciplinary approaches, our department continues to explore areas such as process optimization, nanomaterials, renewable energy, waste management, and advanced separation technologies. These efforts not only strengthen our academic foundation but also enhance the global relevance of our work.

STAR ACHIEVERS (ACADEMICS)

AKTU Medallists & Rank Holders

Sujata Mall

Gold Medalist | B. Tech.

Anushi Rastogi

Gold Medalist | B. Tech.

Komal Sharma

Gold Medalist | B.Tech

Ginni Tyagi

2nd Rank | 2022-23

GATE Rankers

Kalash Siwach

AIR 842

Gauri Garg

AIR 1236

Syed Tameemuddin

AIR 912

Hritik Singhal

AIR 1754

INNOVATE , ENGINEER , INSPIRE
: THE ENTREPRENEURIAL PATH

Chemical engineering is not just about studying chemicals and processes; it also opens doors to exciting entrepreneurial opportunities. With a strong foundation in chemistry, physics, and process engineering, chemical engineers can turn innovative ideas into real-world solutions. From developing sustainable materials, biofuels, and eco-friendly packaging to creating advanced water purification systems, the possibilities are endless. Entrepreneurship in this field allows engineers to combine technical knowledge with creativity and business skills, addressing global challenges like energy scarcity, pollution, and resource efficiency. With the rise of start-ups, incubators, and funding opportunities, chemical engineers today can transform ideas into profitable and impactful ventures, contributing to technological advancement, sustainable growth, and a better future for society. Here are some of the entrepreneurs from our Chemical Engineering Department who have made remarkable contributions in this field.

Girish Tyagi

FOUNDER

Neo Solutions Hub

Piyush Trivedi

FOUNDER

Technovacer

Sandeep Baisla

FOUNDER

BIIR Project Consultancy

Areeb Siddiqui

CO-FOUNDER

BHA Chemicals

Vikas Verma

CO-Founder

BHA Chemicals

ALUMNI SPEAK: VOICES OF INSPIRATION

Our Chemical Engineering alumni have ventured into diverse fields, transforming their technical knowledge into successful enterprises and meaningful innovations. They stand as inspiring role models for current students, demonstrating how creativity, perseverance, and expertise in chemical engineering can be combined to solve real-world problems, drive technological progress, and make a positive impact on society. Beyond academic achievements, these alumni have embraced entrepreneurship, research, and leadership roles, showcasing the versatility of a chemical engineering background. Their journeys highlight the importance of innovation, sustainability, and social responsibility, inspiring the next generation to think beyond conventional career paths and pursue ventures that not only advance technology but also contribute to a better and more sustainable future for all.

Lecturer

I have spent the most memorable time of student life in MIET. The mentors at MIET helped in analyzing and solving various core issues in effective manner that helped me to excel in my life. Overall atmosphere helps in overall and all-round development of the student.

Abhinav Jain

Lecturer

I have spent my golden days at MIET, I feel extremely proud to call myself "MIETIAN" where my career was molded. I take this opportunity to thank the management and the staff members for shaping me into a better person.

Chetan Kumar Garg

Senior Associate

I am Mayank Agarwal, currently working as Process Engineer in Spray Engg. Devices Mohali, Punjab. My journey of MIET has been memorable. The Faculties were very helpful and guided me at every step of my journey. I had learnt a lot by participated in extracurricular as well as in academics. Now after passing out and being a professional, I really cherish those college Day.

Mayank Agarwal

PLACEMENT RECORD 2024-25

Placement plays a vital role in bridging the gap between academic learning and professional success. In Chemical Engineering, where theory meets large-scale industrial application, placements offer students the opportunity to apply their knowledge, develop technical competence, and contribute to diverse sectors such as petrochemicals, energy, pharmaceuticals, food processing, environmental engineering, and materials science.

The Department of Chemical Engineering takes pride in its consistent placement record and in nurturing graduates who excel in both technical and managerial roles. With continuous support from the Training and Placement Cell, students are guided through mock interviews, aptitude sessions, industrial visits, and soft-skill development programs that prepare them for competitive recruitment processes.

S.No	Course	Branch	Year	Roll No.	Student Name	Company Name
1	B.Tech	CH	4	2100680510001	Abhishek Rai	Merino Industries
2	B.Tech	CH	4	2100680510004	Deepanshu Mohity	Laxmi organic Industries Limited
3	B.Tech	CH	4	2100680510005	Manikant Singh	Kamakhya Bio fuels
4	B.Tech	CH	4	2100680510006	Mili Parashar	Continental India P Ltd
5	B.Tech	CH	4	2200680519001	Ankit Sharma	IPS Automation Products PVT LTD
6	B.Tech	CH	4	2200680519002	Annu Kumari	Triune Energy Services
7	B.Tech	CH	4	2200680519003	Aparna Singh	Nuberg
8	B.Tech	CH	4	2200680519004	Avtar Singh	Placed SS Gas Lab

ABOUT THE DEPARTMENT OF CHEMICAL ENGINEERING

Courses Offered:

- B.Tech.

Approvals & Accreditations:

- Approved by AICTE
- Affiliated with AKTU

Laboratory Facilities:

- Heat Transfer Lab
- Chemical Technology Lab/ Environmental Engineering Lab
- Energy Lab
- Process Instrumentation Lab
- Process Dynamics & Control Lab
- Mass Transfer Lab
- Chemical Reaction Engg. Lab
- Fluid Mechanics Lab
- Mechanical Operation Lab

INFRASTRUCTURE

PEOPLE WHO BROUGHT PROUD TO CHEMICAL ENGINEERING

George Maxwell Richards, a distinguished chemical engineer with degrees from Manchester and Cambridge, transitioned from Shell Trinidad to academia as a professor at UWI. His analytical mindset and problem-solving skills shaped his impactful leadership as President of Trinidad and Tobago, inspiring innovation and efficiency in governance.

Mukesh Ambani, a visionary entrepreneur, holds a chemical engineering degree and left Stanford to build Reliance Industries. His leadership transformed it into a global giant, reshaping industries and empowering millions.

Dr. Y. Nayudamma, a visionary scientist, excelled in chemical technology and leather research. He led India's CSIR, advanced global scientific collaboration, and shaped academic excellence, leaving an enduring legacy of innovation.

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