Vol:8 Issue 1 2025

Dr. M.G.R.
EDUCATIONAL AND RESEARCH INSTITUTE
DEEMED TO BE UNIVERSITY
University with Graded Autonomy Status
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Periyar E.V.R. High Road, Maduravoyal, Chennai-95. Tamilnadu, India.

FACULTY OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF MECHANICAL ENGINEERING

Message:

HOD
DEPUTY HOD'S
EDITORS

ARTICLES CORNER

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2.The Future of Learning Tools in Mechanical Engineering
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Vol:8 ISSUE 1-2025

HOD-DESK

MESSAGE

by,
Dr.K.RAJAN,
HOD/Mech Engg.

HOD message:

Greetings!

I am delighted that Dr. MGR University has provided us with the opportunity and vision to support the release of the Newsletter series throughout all quarters of each academic year. This platform serves as a valuable forum for connecting with all stakeholders and fostering a sense of community.

I am especially pleased to see our department releasing the Newsletter for the period of January 2025 to March 2025. Wishing for many more successful editions ahead and an enriching reading experience for all!

Vol:8 ISSUE 1- 2025

DEPUTY HOD-DESK

MESSAGE

by,
Dr.A.MANOJ BABU,
Deputy HOD/Mech Engg.

The Newsletter serves as a mirror, reflecting the vibrant activities and achievements of the department. It provides a platform where students from all walks of life can have their voices heard in an inclusive space that embraces and encourages diverse thoughts and perspectives.

I am pleased to see our department releasing its First Quarter Newsletter for 2025. May it successfully fulfil its purpose of informing, inspiring, and connecting our community. Wishing everyone an engaging and insightful read!

MESSAGE

Message:

It gives us immense pleasure to be an integral part of this Newsletter—a powerful communication platform designed to meet the needs of the time. It serves as a bridge, delivering key messages about significant events, achievements, and milestones to all concerned.

Beyond being an information channel, the Newsletter fosters a strong sense of belonging among faculty, alumni, and students. Life does not offer rewinds, only flashbacks, and our talented alumni possess a wealth of experience and skills to share with current students through insightful talks and newsletters.

We believe our efforts will be truly meaningful when, after reading these articles, you feel inspired and motivated to contribute even more to future editions. Let's continue this journey of knowledge sharing, collaboration, and growth together!

EDITORIAL BOARD


REAL

Vol:8 ISSUE 1- 2025

ACTION CORNER

SNIPPETS FROM PALS AND OUR UNIVERSITY

JANUARY TO MARCH			
DATE	**EVENT TITLE**	**SPEAKERS**	**EVENT COORDINATE**
6 March, 2025	Subject Lecture on Continuous Improvement Systems	K.RAJAN, Assistant Professor, Dr.M.G.R Educational & Research Institute	
26 March, 2025	Subject Lecture on Heat and Mass Transfer	P.RAVICHANDRA GANESH, Assistant Professor, Dr.M.G.R Educational & Research Institute	

PALS: JANUARY

EVENT : Finishing School Program for Electronics Manufacturing Industry
ORGANIZER: PALS in collaboration with IITM CEC (Centre for Continuing Education)
DATE : 04.01.2025
(Announcement / InitiativeCommencement)
VENUE : IIT Madras Campus (Hands-on Training)

PALS, in collaboration with the IITM Centre for Continuing Education (IITM CEC), introduced the Finishing School Program specifically designed for students from Circuit Branches and Mechanical Engineering. The initiative aims to bridge the gap between academia and industry requirements, ensuring participants are thoroughly equipped for career opportunities in the rapidly growing Electronics Manufacturing Sector. The program highlights include official certification by IITM CEC, targeted technical skilling, and a subsidized course fee structure to ensure accessibility. A key feature of the program is two weeks of immersive, full-time hands-on training conducted directly at the IIT Madras campus, effectively preparing a batch of industry- ready engineering professionals.

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ARTICLES CORNER

Automation and Industry 4.0:

Are We Ready for the Smart Factory?

by,

. Mr. Andrew Nallayan,
Asst. Professor/ Mech Engineering.

In the modern era of rapid technological progress, **Industry 4.0** has emerged as a transformative concept that is reshaping the manufacturing landscape. Often referred to as the **Fourth Industrial Revolution**, it integrates advanced technologies like **artificial intelligence (AI), the Internet of Things (IoT), robotics, big data, and cloud computing** to create highly efficient, intelligent, and connected production systems — known as **Smart Factories**.

From Automation to Intelligence

Automation has long been a cornerstone of manufacturing, enabling machines to perform repetitive tasks with precision and speed. However, Industry 4.0 takes this concept a step further by introducing **intelligent automation** — where machines not only execute commands but also **communicate, learn, and adapt** in real time. For instance, predictive maintenance systems can anticipate machine failures before they occur, minimizing downtime and reducing costs.

The Core of the Smart Factory

A Smart Factory is not just a collection of robots and sensors. It's a dynamic ecosystem were **data flows seamlessly** between physical and digital systems. Every component — from assembly lines to logistics — is interconnected through **cyber-physical systems**, enabling decentralized decision-making and continuous optimization.

Some key features include:

- **Real-time monitoring** of production and quality.
- **Digital twins** for virtual simulations of processes.
- **Adaptive production systems** that adjust to demand and resource availability.
- **Human–machine collaboration**, enhancing both safety and productivity.

Challenges Ahead

While the vision of Industry 4.0 is exciting, the transition to Smart Factories poses significant challenges. Many industries, especially in developing economies, struggle with:

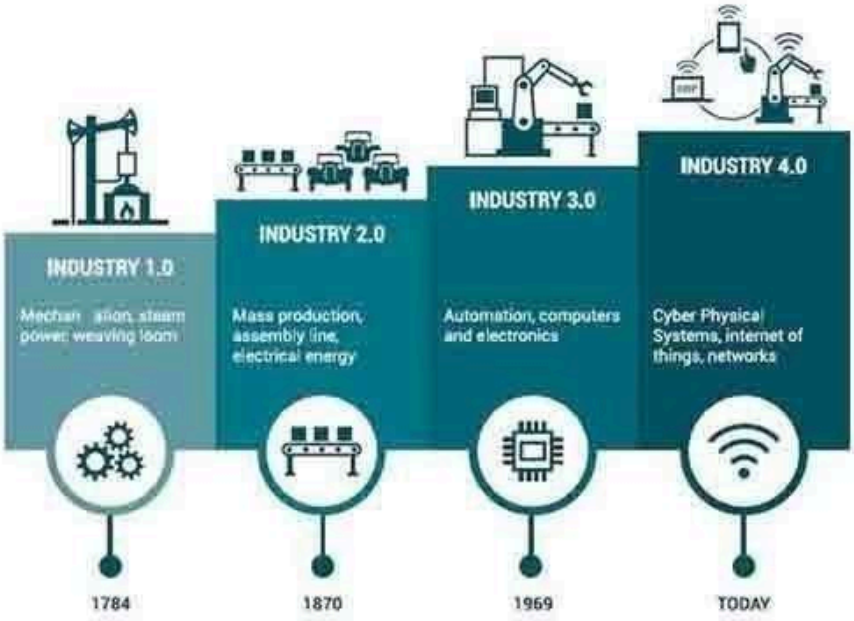
- **High implementation costs** of automation technologies.
- **Lack of skilled workforce** trained in digital and data-driven tools.
- **Cybersecurity risks** associated with interconnected systems.
- **Resistance to change**, as traditional industries adapt to new paradigms.

The Road to Readiness

For colleges and engineering students, Industry 4.0 presents a tremendous opportunity. The workforce of the future will need **interdisciplinary skills** — combining mechanical, electrical, and computer engineering with data analytics and AI. Academic institutions are now beginning to incorporate **smart manufacturing labs, IoT-based projects, and robotics training** into their curricula to prepare students for this digital shift.

Conclusion

The journey toward fully realizing the Smart Factory is still ongoing. While the technologies exist, achieving complete integration requires **vision, investment, and skilled talent**. As we stand at the crossroads of innovation and industry, the real question remains — **are we ready to embrace the future of intelligent manufacturing?**



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From Chalkboard to ChatGPT: The Future of Learning Tools in Mechanical Engineering

BY: MR.R.T.CHANDER, Asst Professor, Mech Engineering

The world of mechanical engineering has always thrived on innovation. From the age of steam engines to the rise of robotics and automation, every era has been defined by new tools, new materials, and new thinking. Yet, one of the most remarkable revolutions is happening not inside factories or research labs, but inside classrooms — in the way engineers are being taught and trained. The journey from **chalkboard to ChatGPT** marks not just a change in tools, but a transformation in how knowledge itself is shared, understood, and applied.

The Chalkboard Era: Where It All Began

For decades, the chalkboard was at the heart of every mechanical engineering classroom. It was where the laws of thermodynamics, fluid mechanics, and machine design were first introduced. Teachers explained complex derivations step by step, while students scribbled formulas, diagrams, and freehand sketches. Those dusty blackboards carried the essence of interactive learning — direct communication, instant feedback, and a deep personal connection between teacher and student.

Even today, many engineers look back fondly on those sessions, where imagination met mathematics, and where simple chalk lines could represent turbines, gear trains, and internal combustion engines.

The Digital Leap: From Boards to Bytes

The late 20th century brought the **digital revolution** into classrooms. Projectors, whiteboards, and PowerPoint presentations became the new standard. More importantly, tools like **AutoCAD, SolidWorks, and ANSYS** transformed how mechanical concepts were visualized and tested. Complex 3D models replaced 2D sketches, while simulations replaced hours of manual calculation.

Online learning platforms further expanded access to knowledge. A student in one corner of the world could now learn finite element analysis, robotics, or control systems from global experts. Mechanical engineering education became faster, more visual, and far more collaborative.

The AI Revolution: Enter ChatGPT

Today, we stand at the next major turning point — the **AI-driven learning era**. Artificial intelligence tools like **ChatGPT** have introduced a new dimension of interactivity and personalization into education. They allow students to not only receive information but also **engage in meaningful dialogue** with technology.

In mechanical engineering, AI-powered assistants can now:

- Explain design principles and manufacturing processes in simple terms.
- Help students derive equations or verify problem-solving steps.
- Suggest improvements in CAD models or report formatting.
- Generate innovative design ideas or case studies.
- Assist teachers in preparing lecture notes, quizzes, and assignments.

What once required a library full of reference books can now be accessed and explained in moments.

Learning Smarter, Not Just Faster

One of the most exciting aspects of AI in mechanical education is **personalized learning**. Every student learns differently — some grasp dynamics through visual simulations, others through hands-on projects. AI can analyze progress, identify weak areas, and provide customized support. This kind of adaptive learning helps students master difficult topics like vibration analysis, material behavior, or control systems at their own pace.

In addition, AI encourages **collaboration across disciplines**. Modern mechanical engineers often work with electrical, computer, and materials engineers. ChatGPT and similar tools help bridge these fields by providing knowledge from multiple domains instantly, fostering a more holistic understanding of engineering problems.

Balancing Technology and Human Touch

However, even the smartest AI cannot replace the creativity, intuition, and mentorship of human educators. Mechanical engineering is as much an art as it is a science — it requires curiosity, teamwork, and practical insight. While AI can provide answers, it cannot replicate the thrill of solving a real-world design problem, the teamwork in a workshop, or the satisfaction of seeing a prototype come to life.

The real challenge, therefore, is **balance** — learning to use AI as an assistant, not as a crutch. Students must continue to think critically, question assumptions, and apply knowledge practically. After all, the strength of an engineer lies not in remembering formulas, but in understanding and applying them creatively.

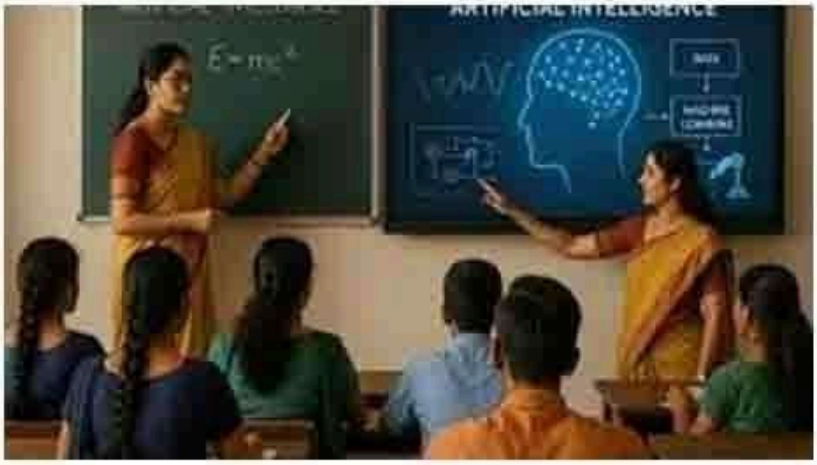
The Road Ahead

As the mechanical engineering classroom evolves, future students will likely experience a **hybrid learning model** — one that combines traditional teaching, digital resources, and AI-driven support. Virtual labs, simulation-based learning, and interactive tutoring systems will complement physical workshops and real experiments. This blend of technology and experience will produce engineers who are not just technically skilled but also adaptive, innovative, and globally connected.

Conclusion

From chalkboards filled with equations to chatbots filled with intelligence, the tools of learning have changed — but the mission remains the same: to create engineers who can design, innovate, and build for a better tomorrow.

AI tools like ChatGPT are not the end of traditional learning, but the evolution of it — helping students visualize, question, and understand complex mechanical systems in new ways. As we move forward, the successful engineer will be one who **uses both mind and machine** — harnessing the power of AI while retaining the creativity and curiosity that define true engineering.



Hidden Talents of Our Students – Art Beyond Academics

By: Jai Kishore.M, 3rd Yr, Mechanical Engg.

College life is often seen as a time for lectures, assignments, and exams — but it's also a time for discovering who we truly are. Beyond the classrooms and laboratories, many of our students are exploring a different side of learning — one that's driven by creativity, emotion, and imagination. These are the *hidden talents* that make our campus vibrant, inspiring, and full of life.

A Canvas of Creativity

Every student has a story, and for some, it's told through art. Walk around the campus, and you might find someone sketching in a notebook between classes, painting breathtaking landscapes, or crafting designs that speak louder than words. For others, music is their language — from soulful singers to talented guitarists, drummers, and keyboard players who add rhythm to college life.

Then there are dancers who express emotions through movement, actors who bring characters to life on stage, and photographers who freeze fleeting moments into lasting memories. Each of them contributes to a culture where creativity thrives alongside academics.

More Than Just a Hobby

For many students, these talents are not just side interests — they are forms of self-expression and emotional balance. Amidst the pressure of academic deadlines and exams, art becomes a source of peace and motivation. It helps students stay connected to their inner selves while also boosting their confidence and social bonds.

Participating in college fests, cultural competitions, and art clubs gives students a chance to showcase their work and inspire others. Whether it's a painting exhibition, a music night, or a dance performance during annual celebrations, every stage becomes a platform to celebrate originality.

Inspiration All Around

Our college has always encouraged students to explore their passions beyond academics. The cultural committee and various clubs provide opportunities to learn, perform, and collaborate. Events like *Talent Hunt*, *Art Exhibition Week*, and *Open Mic Evenings* have become spaces where hidden artists come into the spotlight.

What's most inspiring is how students support and celebrate each other's creativity. A simple applause after a performance or an encouraging comment on a piece of art often motivates others to step forward and share their own hidden talents.

Art Beyond Academics

Art, in any form, teaches lessons that books often cannot — patience, expression, innovation, and resilience. It reminds us that education is not just about grades, but about growth. As future engineers, doctors, teachers, or entrepreneurs, these artistic qualities will help us think differently, solve problems creatively, and connect deeply with the world around us.

In the end, our hidden talents define who we are just as much as our academic achievements do. They add color to our journey, turning ordinary college days into unforgettable experiences. As students, we take pride in balancing both — the pursuit of knowledge and the passion for art — because true education lies in embracing *both mind and heart*.

Success Story of Indra Nooyi

by, Hari Krishnan D, 3rd Yr, Mechanical Engg

The Success Story of Indra Nooyi – Former CEO of PepsiCo

In the vast world of business and leadership, few names shine as brightly as **Indra Nooyi**. Her story is not just about breaking the corporate glass ceiling, but about transforming the way the world sees leadership, perseverance, and purpose. From a modest home in **Chennai, India**, to the powerful boardrooms of **New York City**, Indra's journey is a tale of determination, courage, and unwavering ambition.

Early Life – A Journey Rooted in Values

Born on **October 28, 1955**, into a middle-class Tamil family, Indra Krishnamurthy Nooyi grew up in a culture that valued education, discipline, and hard work. Her mother played a significant role in shaping her ambitions. Each evening, she would ask her daughters to imagine themselves as world leaders and give speeches — unknowingly preparing Indra for her future role as one of the world's most influential CEOs.

After completing her schooling, Indra pursued a **bachelor's degree in Physics, Chemistry, and Mathematics** from *Madras Christian College*. She later earned an **MBA from the Indian Institute of Management (IIM) Calcutta**, one of India's most prestigious institutions. Her academic excellence and curiosity for innovation set her apart early in life.

Dreaming Beyond Borders

(Suggested image: A photo of Yale University campus or an airplane symbolizing ambition.)

Indra's thirst for knowledge and new challenges took her to the **United States**, where she joined the **Yale School of Management** in 1978 to pursue a master's degree in *Public and Private Management*.
Life in the U.S. was not easy at first — she worked part-time as a **receptionist at night** to support herself while studying during the day. This period tested her resilience and adaptability, teaching her that **success is built one determined step at a time**.

The Rise of a Visionary Leader

Indra began her professional career with **Johnson & Johnson** and then worked with **The Boston Consulting Group (BCG)**, gaining experience in product management and global strategy. Her innovative thinking and people-first approach helped her rise quickly in every organization she joined.

In **1994**, she joined **PepsiCo** as Senior Vice President of Strategic Planning. Her bold ideas and sharp strategic mind soon caught the attention of the company's top executives. She played a key role in **acquiring Tropicana** and **merging with Quaker Oats**, both of which became landmark moves that strengthened PepsiCo's global presence.

Leading PepsiCo to New Heights

In **2006**, Indra Nooyi achieved what many only dream of — she became the **CEO of PepsiCo**, making her one of the few women and the first Indian-born executive to lead a Fortune 500 company.

Her leadership philosophy, "**Performance with Purpose**," became a guiding principle at PepsiCo. She believed that a company's success should not be measured by profits alone, but also by how it impacts **people and the planet**.
Under her leadership:

- PepsiCo introduced **healthier products**, reducing sugar, salt, and fat content.
- The company made massive investments in **sustainability and recycling**.
- Revenues grew from **$35 billion to over $63 billion**.
- She inspired a **culture of innovation, inclusion, and responsibility**.

Leadership Philosophy and Values

Indra Nooyi's leadership style was deeply rooted in empathy and long-term vision. She often said,

"Leadership is not about the next quarter's earnings; it's about ensuring your company lasts for generations."

She encouraged her employees to balance professional success with personal integrity. She also famously wrote **letters to the parents of her top executives**, thanking them for raising such capable leaders — a gesture that reflected her deep respect for family values.

Legacy and Life Beyond PepsiCo

After leading PepsiCo for **12 remarkable years**, Indra stepped down as CEO in **2018**, leaving behind an incredible legacy. Today, she continues to serve on the boards of major organizations like **Amazon** and actively promotes **women's leadership and education**.

Her autobiography, *"My Life in Full: Work, Family, and Our Future"*, provides a deeper insight into her struggles, sacrifices, and dreams. It serves as an honest reflection of a woman who balanced motherhood and corporate leadership with grace and strength.

Lessons from Indra Nooyi's Journey

1. **Dream Big, Work Hard:** Success begins with believing in yourself.
2. **Stay Rooted in Values:** Integrity and empathy make great leaders.
3. **Never Stop Learning:** Education is a lifelong process.
4. **Lead with Purpose:** Profit and social responsibility can go hand in hand.
5. **Embrace Challenges:** Every obstacle is a step toward growth.

Conclusion

Indra Nooyi's story is not just about corporate triumph — it is about courage, humanity, and vision. She represents the spirit of modern India: confident, compassionate, and committed to making a difference in the world.
Her journey reminds us that no dream is too big and no barrier too strong for those who believe in hard work and purpose.

"Just because you are a woman, don't be afraid to dream big. The world needs your ideas, your compassion, and your courage." — **Indra Nooyi**

ALUMNI CORNER

My college journey

By, Bilal Hussain

Mechanical Engineering

May 2012 - May 2016

My College Journey at Dr. MGR University: A Story of Growth, Friendships, and Success

College isn't just about lectures, assignments, and exams—it's a transformative chapter that shapes who we become as individuals. My journey at Dr. MGR University from May 2012 to May 2016 was nothing short of life-changing. It was a period filled with learning, laughter, challenges, and unforgettable friendships. From the nervous excitement of my first day to the joy of landing my first job, every moment added a new layer to who I am today. Looking back, those four years were not just about earning a degree—they were about discovering myself, building confidence, and finding my true direction in life.

The Beginning: Stepping Into a New World

I still remember my first day at Dr. MGR University as if it were yesterday—excited, anxious, and unsure of what awaited me. The sprawling campus, buzzing with energy and filled with students from different parts of the country, felt both exciting and overwhelming. Coming from a structured school environment, college life seemed like stepping into a whole new world of independence and opportunities.

It didn't take long for me to realize that college was more than just classrooms and textbooks—it was about exploring possibilities, meeting new people, and learning lessons that no textbook could ever teach.

First-Year Lessons: Adapting and Overcoming

The first year came with its share of challenges. Adapting to university-level studies, managing a busy schedule, and making new friends was tougher than expected. There were days when I questioned if I was good enough or if I could handle the pressure. But those early struggles turned out to be the foundation for my personal growth.

Long hours in the library, late-night discussions with friends before exams, and the determination to do better after every test slowly helped me adapt. I began to understand that success in college wasn't about being perfect—it was about being persistent.

Beyond Books: Discovering My Passion

One of the best parts of my time at Dr. MGR University was the wide range of extracurricular opportunities that helped me discover my interests beyond academics.

Joining the Society of Mechanical Engineers opened my eyes to real-world applications of classroom theories. Attending workshops, industrial visits, and technical symposiums made me more passionate about engineering.

Being part of the Event Management Club taught me how to lead, organize, and work as part of a team. Planning college fests, coordinating events, and managing people gave me a sense of responsibility and pride.

Participating in community service programs reminded me of the importance of empathy and giving back to society.

These experiences not only made college life more exciting but also helped me grow as a person—teaching me teamwork, leadership, and communication skills that would later prove invaluable in my career.

Memorable Moments and Achievements

My journey was filled with moments that I'll cherish forever. One of the proudest was when my team participated in a national-level technical competition. We spent countless hours designing and perfecting our project, pushing ourselves beyond our comfort zones. The thrill of securing second place after so much effort was indescribable—it felt like all those sleepless nights had finally paid off.

Another milestone was presenting a research paper at a student conference. Standing on stage, sharing my ideas, and receiving appreciation from professors and peers boosted my confidence tremendously. These experiences taught me that success is not about luck—it's about preparation, perseverance, and passion.

The Final Year: Dreams Turn Into Reality

By the time my final year (2015–2016) arrived, I had grown from a shy fresher into a confident engineer-in-the-making. The final year brought new responsibilities—major projects, internships, and of course, the much-awaited campus placements.

The atmosphere during placement season was electric—filled with nervous energy, excitement, and endless preparations. My friends and I would spend hours practicing interviews and revising technical concepts. Then came the unforgettable moment—the day I received my first offer letter from a reputed company in the energy sector. That feeling of accomplishment and pride is something I'll never forget. It was the reward for four years of hard work, learning, and resilience.

Gratitude and Reflections

As I stepped out of Dr. MGR University in May 2016, ready to begin my professional journey, I realized how deeply those years had shaped me. I owe my growth and success to:

My professors, whose mentorship and guidance strengthened my technical foundation.

My family and friends, who supported me through every challenge and celebrated every victory.

Dr. MGR University, which provided me with an environment to learn, explore, and transform into the person I am today.

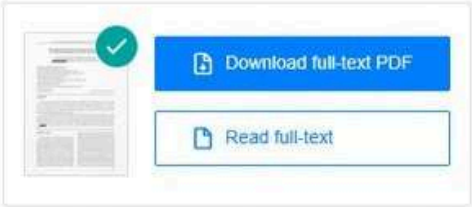
College was more than just a chapter—it was a story of self-discovery, filled with hard work, laughter, friendships, and dreams taking shape. As I continue my journey in life, I carry with me the lessons and memories of those four years—a time that didn't just prepare me for a career but helped me discover my purpose.

PUBLICATIONS

Article PDF Available

EXPLORING THE EFFECTS OF PILOT INJECTION TIMING ON CRDI ENGINE OPERATION UNDER VARYING LOADS

March 2025 · Journal of Chemical Technology and Metallurgy 60(2):301-310
DOI:10.59957/jctm.v60.i2.2025.12



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