



# ROHINI

COLLEGE OF ENGINEERING AND TECHNOLOGY

Approved by AICTE and affiliated to Anna university. (An ISO Certified Institution)

Accredited by NAAC with A+ Grade | Recognized under section 2(f) of University Grands Commision, UGC Act 1956  
(AUTONOMOUS)



DEPARTMENT OF MECHANICAL ENGINEERING

# MECHATRONIC

## 2K24



MECHANICAL ENGINEERING ASSOCIATION

# **MECHTRON'24**

**2023 - 2024**

## **Chief Patron**

**SHRI.K.NEELA MARTHANDAN (Chairman)**

## **Patrons**

**Dr.N.NEELA VISHNU (Pro Chariman)**

**Dr.BLEESY JEO (Managing Director)**

## **Co-Patron**

**DR.R.RAJESH (Principal)**

## **Editor in Chief**

**Dr.M.EZHILAN**

## **Associate Editor**

**Prof.G.PRADEESH**

**Prof.V.ABILESH**

## **Assistant Editor**

**R.ROBIN RAJA**

## **Editorial Board Members**

**Prof.V.PRAWYN JEBA**

**Prof.C.SUREN**

## **MECHTRON'24**

is an annual magazine, brought out by Rohini College of Engineering & Technology, Kanyakumari. The articles published are copy-righted. If you have any queries or feedback, address them to [machtrons2k24@gmail.com](mailto:machtrons2k24@gmail.com)

**Address:** **ROHINI College of Engineering & Technology**

Near Anjugramam Junction, Kanyakumari Main Road,  
palkulam ,Kanyakumari 629 401,  
Tamilnadu, India

Phone: 04652-266665

Email: [admin@rcet.org.in](mailto:admin@rcet.org.in)

Website: [www.rcet.org.in](http://www.rcet.org.in)

## **ABOUT DEPARTMENT**

The Department of Mechanical Engineering started in the year 2012 with an initial intake of 60 students to the B.E Program and increased to an intake of 120 students from 2013 and 180 students from 2014. The Department offers ME Thermal Engineering programme from 2015 with an intake of 24 students. The Department is a recognized research centre by Anna University Chennai from the year 2019. The department accomplish outcome Based Education which help the students to learn, develop and serve to the society. The Department has experienced and dedicated faculty with a wide range of specialization namely Thermal Engineering, Engineering Design, Manufacturing Engineering, Energy Engineering, CAD/CAM, Industrial Engineering and Mechatronics.

The faculty members have published more than 100 papers National/International journals/Conference and had written books, filed patterns during the last 3 years and received many awards. The students were motivated by providing lot of opportunities like technical presentation in Symposium, conferences for skill development. The department provide value added knowledge to under graduates and post graduate students. Apart from curriculum students were motivated to participate in sports. The department has well established laboratory facilities to conduct research work on different specialized areas like Material Science, Renewable Energy, Thermal Science. The students of the department have received external research funding from Tamil Nadu State council for Science and technology in recent years. The students of the departments have joined in reputed industries through placements and some of them are turned to be an entrepreneur. The department has a good network of alumni.

## **VISION**

To inculcate competence in the field of mechanical engineering for the students by providing quality education and learning opportunities to become ethically strong engineers for the development of society.

## **MISSION**

To provide fundamentals and technical skills in Mechanical Engineering through effective teaching-learning methodologies.

To provide an ambience for research through collaborations with industry and academia.

To inculcate the students' leadership quality through employability skills with ethical

## **PROGRAMME EDUCATIONAL OBJECTIVES (PEO'S)**

### **PEO: 1**

**Graduates will apply the knowledge of Mechanical Engineering concepts and innovative methods to solve real world Engineering problems**

### **PEO: 2**

**Graduates will have the required qualities for a successful carrier in Mechanical Engineering and related fields.**

### **PEO: 3**

**Graduates will exhibit the professional skills with ethical values, Communication skills and team spirit.**

## **PROGRAMME SPECIFIC OBJECTIVES (PSO'S)**

### **PSO: 1**

**Graduates of the program will achieve optimized design by utilizing their knowledge in thermalengineering, material science, manufacturing, fluid**

### **PSO: 2**

**Graduates will be able to analyse and interpret by using modern tools and provide solutions to real time mechanical engineering and related problems.**

### **PSO: 3**

**Graduates will learn managerial skills to work effectively in a team and are aware of the impact of professional engineering solutions in human community, environmental context, ethics and be able to communicate effectively.**



# Chairman's Message

**"Education is for improving the lives of others and for leaving your community and world"**

I deem it to be a matter of immense pleasure and honour for me to address you all through the website of ROHINI College of Engineering & Technology. It is indeed very heartening to witness that the college has carved a name for itself in the academic scenario of the region. Education is the most powerful tool to bring desirable changes in our personality and also to bring positive changes in our society. It is the only medium which enables you to move from darkness to brightness.



Dear friends, I strongly believe that, there can be no better way to drive and improve our nation's prosperity and social economic well-being than through its education system. I also believe that, technocrats are the key to continued economic and technological advancement of our country.

I would take this opportunity to urge you all to focus on all round development. You should always have your education laced with morality and ethics. This task has to be taken over by the academicians to provide value and ethic based education. You should all remember that, "honesty is the first chapter in the book of wisdom" and we should inculcate honesty and integrity in all what we do.

I earnestly hope and trust that, my esteemed academicians and budding technocrats will work with sincerity, honesty and dedication and thereby contribute to make this world a better place to live in.

Best Wishes,  
**Shri.K.NEELA MARTHANDAN**  
Chairman  
ROHINI Groups.



# Principal's Message

**'We make technocrats, who proudly say 'I am an Engineer; I serve mankind, by making dreams come true.'**

The major challenge for today'S engineering educational institutions is to accommodate the evervarying aspirations of the younger generation because of increasingly changing demand and development in industries. We constantly put efforts to accommodate these aspirations by fine tuning the academics of college with innovative and practical oriented teaching learning practices along with other developmental activities.



idealistic, but this is precisely our long term goal. It is what motivates the work of everyone at the ROHINI College of Engineering and Technology from faculty and staff, to students and alumni. It inspires our teaching and research. It is this goal which fuels the faculty to excel

Our approach reflects the educational needs of the 21st century. We focus on our students by providing them with a world-class outcome based education and hands-on experience through resear research, training, and student forum activities activities etc. The success of our undergraduate, postgraduate & research programs is supervised by our eminent faculty, who continue to set the standard for excellence. There is continuous check on the implementation of planned academic activities with desired results in grooming our future generation for employment and for higher studies in India and abroad. A research culture has taken shape in the institute through enhanced IR & D activities. We believe in continuous development and strive to carry on the best efforts and endeavours towards the benefibfstudents.

Our University results and placement speaks about our excellence with many of our students bringing laurel to the college by getting highest ranking in university exams and huge number of students are placed in national & multinational companies, moreover our students' creativity and determination is evident by this continuous success in various fields. Our institute stands by its core values, mission of churning out well-rounded individuals and thorough professionals.

Best Wishes,

**Dr.R.RAJESH, M.E., Ph.D.**

Principal

Rohini College of Engineering & Technology



# HOD's Message

Mechanical engineering is one of the oldest and broadest engineering discipline, and plays a significant role in enhancing safety, economic vitality, enjoyment and overall quality of life throughout the world. A prerequisite for development is growth and that is directly related to production or output of a country. A warm and Green Greetings from the Department of Mechanical Engineering at RCET



A warm and Green Greetings from the Department of Mechanical Engineering at RCET. The college has been simply unstoppable in its progress as it has been actively involved in various activities that have brought to light the hidden talents of the college students and staff. Mechanical Engineering is a professional Core engineering discipline that deals with the design, production and maintenance of any produce of any industry

Our department has a team of highly qualified and experienced faculty, good infrastructure and lab facilities. We are striving hard continuously to improve upon the quality of education and to maintain its position of leadership in engineering and technology. We always work with the motto "Nothing can be achieved without genuine effort." The core values of the department help the students to develop their overall personality and make them worthy to compete and work at global level. Our faculty are continuously attending various training programs, publishing research papers, books and filing patents. Many are pursuing research. Our department has been conducting seminar / conferences to keep the faculty and students abreast with the latest developments in the field of technical education. We are happy to share that many students are pursuing higher studies in leading universities in India and abroad. I am certain that our students will prove to be an invaluable asset to an organization. We, Mechanical engineers to build the nation

Best Wishes,

**Dr. D PRINCE SAHAYASUDHERSON M.E, Ph.D**  
RCET.

HOD of Mechanical Engineering



# Editor's Message

It gives us great pleasure to bring you issue of **MECHTRON 2024**, the Mechanical department technical magazine of Rohini College of Engineering and Technology, Kanyakumari

The objective of the magazine is to mainly focus on Achievement of the students from the Mechanical Engineering department in the Co-curricular and Extra-Curricular Activities



The name and fame of an institute depends on the caliber and achievements of the students and teachers. The role of a teacher is to be a facilitator in nurturing the skills and talents of students. This magazine is a platform to exhibit the literary skills and innovative ideas of teachers and students. **MECHTRON 2024** presents the skills and innovative thinking of students and contributions of teachers

We are also thankful to our Management and Principal for their support and encouragement.. Last but not the least we are thankful to all the authors who have sent their articles. We truly hope that the pages that follow will make an interesting read.

**Dr.M.EZHILAN**

**Editor of Department Magazine  
ROHINI College of Engg. And  
Technology**





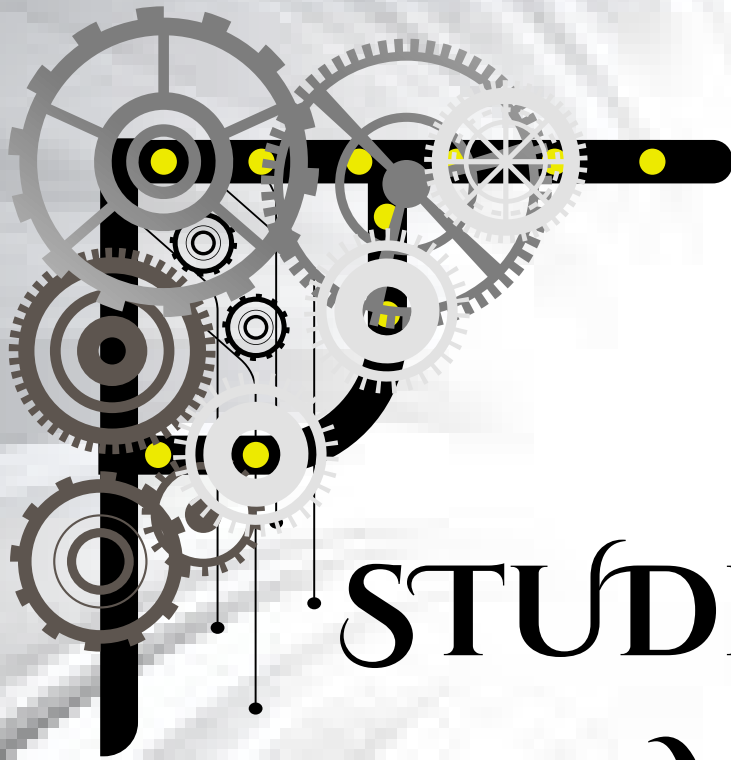
## Rohini College Of Engineering And Technology

A temple of learning, is an ISO certified institution was founded by the great Industrialist and Philanthropist, Shri. K.Neela Marthandan. The main objective of our college is to advance the knowledge base of the engineering professions and to influence the future directions of engineering education and practice.

This is the best Engineering College in Nagercoil, Kanyakumari District. We believe not only in educating the students, but also in grooming characters, with moral and ethical values to build the nation. Since the beginning, the college has been providing world-class facilities & infrastructure in education and learning. The emphasis is on transformational leadership rather than directional leadership. We aim to establish new trends, introduce innovative training methodologies, and thus guide students towards the road to success.

**RCET VISION:** To be an academic institute of continuous excellence towards education, research in rural regime, and provide service to nation in terms of nurturing potentially higher social, ethical and engineering companion graduands.

**RCET MISSION:** To foster and promote technically competent graduands by imparting the state of art engineering education in rural regime. To enunciate research assisted scientific learning by dissemination of knowledge towards science, agriculture, industry and national security.



# STUDENTS ARTICLES



# 1. Artificial Intelligence and Machine Learning in Mechanical Engineering

Artificial intelligence (AI) and machine learning (ML) are transforming mechanical engineering by enhancing design, optimization, production, and maintenance processes. These advanced technologies enable engineers to work more efficiently and innovate in ways that were previously impossible. In this article, we explore how AI and ML are impacting mechanical engineering and revolutionizing various aspects of the field.

## 1. Design and Optimization

- **Generative Design:** AI creates multiple design variations based on parameters and constraints, leading to novel designs.
- **Topology Optimization:** ML optimizes material distribution in structures for strength, weight, and cost balance.
- **Simulation and Analysis:** AI accelerates simulations and analyses by predicting outcomes and providing real-time feedback.

## 2. Predictive Maintenance

- **Condition Monitoring:** ML analyzes sensor data to detect patterns indicating potential failures.
- **Failure Prediction:** AI predicts when equipment may fail, enabling timely maintenance.
- **Maintenance Scheduling:** AI optimizes maintenance schedules for efficiency and reduced downtime.

## 3. Robotics and Automation

- **Autonomous Robots:** AI enables robots to operate independently in complex environments.
- **Computer Vision:** ML allows robots to interpret visual information for tasks such as quality control.
- **Human-Robot Collaboration:** AI enhances safety and cooperation between humans and robots in shared environments.



#### 4. Smart Manufacturing

- **Quality Control:** AI-based systems quickly identify product defects for improved quality.
- **Supply Chain Optimization:** ML analyzes data to optimize supply chain efficiency and predict demand.
- **Process Automation:** AI automates repetitive tasks and optimizes production processes.

#### 5. Research and Development

- **Data-Driven Research:** AI analyzes large datasets for patterns and insights that drive innovation.
- **Rapid Prototyping:** AI automates design adjustments for faster prototyping.
- **Collaborative AI:** AI platforms facilitate collaboration among researchers and engineers

AI and ML are reshaping mechanical engineering, pushing boundaries and driving transformative change across industries. As technologies continue to advance, their impact on the field will only grow.

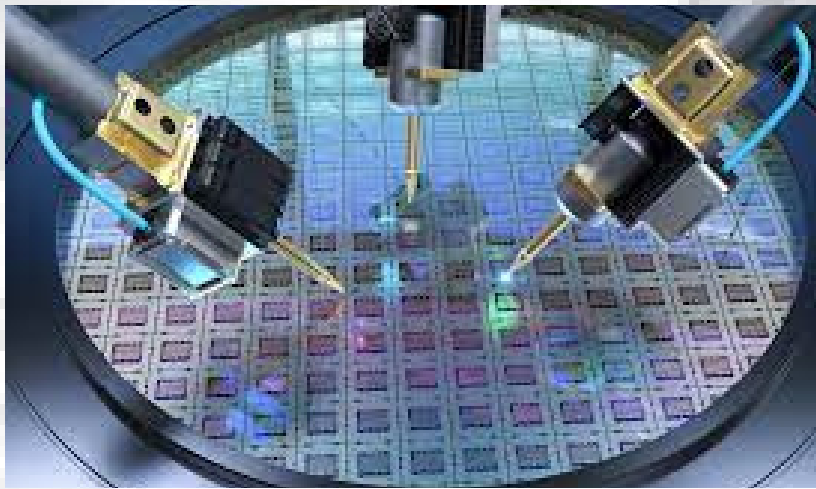
**AATHIL AFRITH.S**  
**3rd YEAR**  
**MECHANICAL - A**



# 2. Advanced Materials and Nanotechnology

## Unlocking the Future of Innovation

In recent years, advanced materials and nanotechnology have emerged as key drivers of innovation across multiple industries. These technologies have the potential to revolutionize various fields, from healthcare and electronics to energy and environmental sustainability. In this article, we will explore the latest trends and breakthroughs in advanced materials and nanotechnology and how they are shaping the future.



### 1. Smart and Responsive Materials

- **Shape Memory Alloys:** These materials revert to their original shape upon heating, offering benefits in aerospace, robotics, and medical devices.
- **Self-Healing Materials:** Materials that repair themselves after damage, increasing durability and reliability.
- **Electroactive Polymers:** Materials that change shape when exposed to electric fields, with applications in soft robotics and sensors.

### 2. Nanomaterials and Nanocomposites

- **Carbon Nanotubes:** Strong and conductive, with uses in electronics, batteries, and lightweight materials.
- **Graphene:** Exceptional electrical, thermal, and mechanical properties for use in electronics and coatings.
- **Nanocomposites:** Enhancing traditional materials' strength, durability, and conductivity.

### 3. Nanomedicine and Drug Delivery

- **Targeted Drug Delivery:** Nanoparticles deliver drugs directly to specific cells, reducing side effects and improving treatment efficacy.
- **Nanosensors:** For early disease detection and monitoring.
- **Nanorobots:** Promising precision medical interventions like tumor removal and blood vessel clearing.

### 4. Energy Storage and Generation

- **High-Performance Batteries:** Nanomaterials improve capacity and lifespan, ideal for electric vehicles and renewable energy storage.
- **Solar Cells:** Nanotechnology enhances light absorption and charge separation.
- **Fuel Cells:** Advanced materials boost performance and durability in clean energy applications.

### 5. Challenges and Future Directions

- **Scalability:** Scaling up production remains complex due to precise processes.
- **Safety and Regulation:** Ensuring safety and creating regulatory frameworks is essential.
- **Interdisciplinary Collaboration:** Progress requires collaboration across materials science, chemistry, physics, and engineering.

Advanced materials and nanotechnology are paving the way for transformative technologies, shaping the future of healthcare, energy, and electronics.

**ASHIMA FAIZA .S.A**  
**3rd YEAR**  
**MECHANICAL - A**

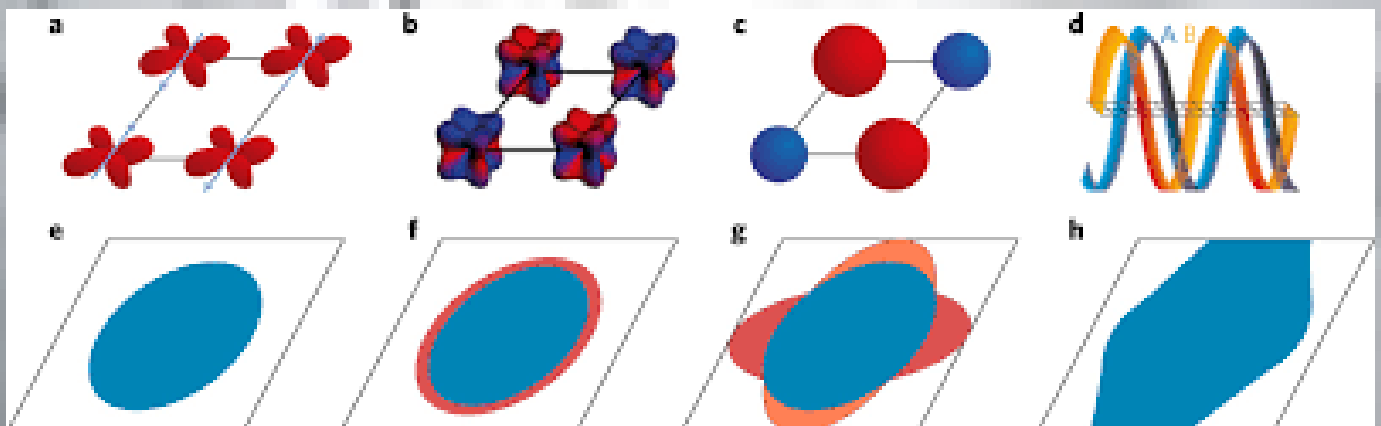


# 3. Quantum Materials and Mechanics

Quantum materials and mechanics are emerging areas of research at the intersection of quantum physics and materials science. These fields focus on studying materials that exhibit quantum behaviors and using quantum mechanics to understand and manipulate materials at the atomic and molecular levels. Here are some key aspects of quantum materials and mechanics:

## 1. Quantum Materials:

- **Topological Insulators:** These materials conduct electricity on their surfaces or edges while acting as insulators in their bulk. They have potential applications in quantum computing and electronics.
- **Quantum Dots and Nanostructures:** These are tiny particles that can confine electrons in small spaces, leading to quantum effects that can be exploited in technologies like quantum computing and sensing.
- **Superconductors:** Materials that conduct electricity with zero resistance at very low temperatures, with potential applications in energy transmission, medical imaging (MRI), and quantum computing.
- **Quantum Magnets:** Materials that exhibit quantum mechanical magnetic properties, such as quantum spin liquids, which can lead to new discoveries in condensed matter physics.



## **2. Quantum Mechanics in Engineering:**

- **Quantum Computing:** Quantum mechanics principles are used to design and build quantum computers, which can solve complex problems much faster than classical computers.
- **Quantum Sensors:** Quantum mechanics is used to create highly sensitive sensors for applications such as navigation, timekeeping, and measuring gravitational fields.
- **Quantum Communication:** Secure communication methods, such as quantum key distribution (QKD), leverage the principles of quantum mechanics to enable secure transmission of information.
- **Quantum Simulation:** Quantum mechanical models can simulate and predict the behavior of complex systems in areas such as materials science, chemistry, and biology.

## **3. Research Challenges and Opportunities:**

- **Material Characterization:** Understanding and characterizing the properties of quantum materials at the atomic and molecular levels is crucial for developing new technologies.
- **Integration into Devices:** Engineering challenges include integrating quantum materials and technologies into practical devices and systems.
- **Scalability and Stability:** Scaling up quantum technologies while maintaining stability and coherence is a significant challenge in the field.

Quantum materials and mechanics offer exciting opportunities for advances in various fields, including computing, communication, sensing, and materials engineering. As research progresses, these technologies may transform how we interact with and understand the world around us.

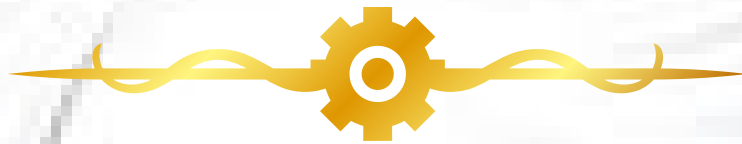
**R.ROBIN RAJA**  
**3rd year**  
**MECHANICAL - C**







# STUDENT'S COMPOSITIONS



# **BEFORE I WAS READY TO SPEAK**

**I needed to discover myself in silence. I don't need to constantly make noise or be in constant movement**

**The real understanding of self comes from being in silence, it comes from the quiet exploration.**

**Even when life is loud out there, I know I can drown out the noise to sit in stillness to really hear my own voice.**

**Sanjeev S.L.  
Final year Mech -C**



# BE A MAN

**"Being a man" in today's world involves embracing a modern understanding of masculinity that goes beyond traditional stereotypes.**

- **Emotional Intelligence:** Recognize and express your emotions and empathize with others.
- **Self-Care:** Prioritize your mental and physical health and seek help when needed.
- **Vulnerability:** Share your struggles and fears openly to build strong connections with others.
- **Support Equality and Respect:** Treat all people fairly and challenge harmful stereotypes.
- **Redefine Success:** Focus on personal goals that align with your values and balance work and life.
- **Build Healthy Relationships:** Practice mutual respect, strong communication, loyalty, and honesty.
- **Show Strength through Actions:** Stand up for what's right, take responsibility for your actions, and learn from mistakes.

**Embracing these qualities leads to a more meaningful and fulfilling life while positively impacting others and promoting empathy and respect across society.**

**R.ROBIN RAJA**  
3rd year  
**MECHANICAL - C**



# ENGINEERING FACTS

LAMBORGHINI CARS WERE A RESULT OF A TRACTOR COMPANY OWNER BEING INSULTED BY THE FOUNDER OF FERRARI

THE GREAT PYRAMIDS OF EGYPT WERE BUILT USING THE ADVANCED KNOWLEDGE OF MECHANICS AND ENGINEERING PRINCIPLES.

- 92% OF ALL NEW SOLD CARS IN BRAZIL USE ETHANOL AS FUEL, WHICH IS PRODUCED FROM SUGAR CANE.

- THE AVERAGE CAR HAS 30,000 PARTS.

- THE TRAUER, IS THE RAREST MOTORCYCLE IN THE WORLD

**SHAJITH HUSSAIN.M**

**3rd YEAR**

**MECHANICAL - C**



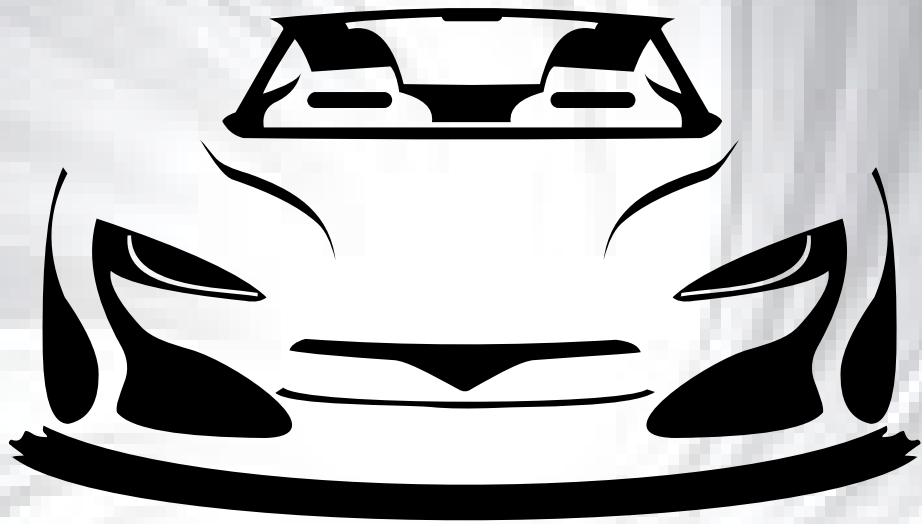
# REASONS TO STUDY MECHANICAL ENGINEERING

- 1. Versatile Career Options:** Work in industries such as automotive, aerospace, energy, manufacturing, and more.
- 2. Innovation and Problem-Solving:** Design and improve products and systems, contributing to technological advancements.
- 3. Strong Job Market:** High demand for skilled mechanical engineers, offering job stability and competitive salaries.
- 4. Hands-On Experience:** Gain practical experience through labs, projects, and internships.
- 5. Interdisciplinary Collaboration:** Work with professionals from other disciplines, fostering holistic problem-solving.
- 6. Global Impact:** Contribute to sustainable energy, healthcare technology, transportation, and other critical fields.
- 7. Continuous Learning:** Stay up to date with evolving technologies and methodologies.
- 8. Creativity and Innovation:** Design innovative solutions and optimize existing systems.
- 9. Entrepreneurial Opportunities:** Leverage skills to start businesses or work on entrepreneurial ventures.
- 10. Global Opportunities:** Collaborate internationally and explore diverse work environments.

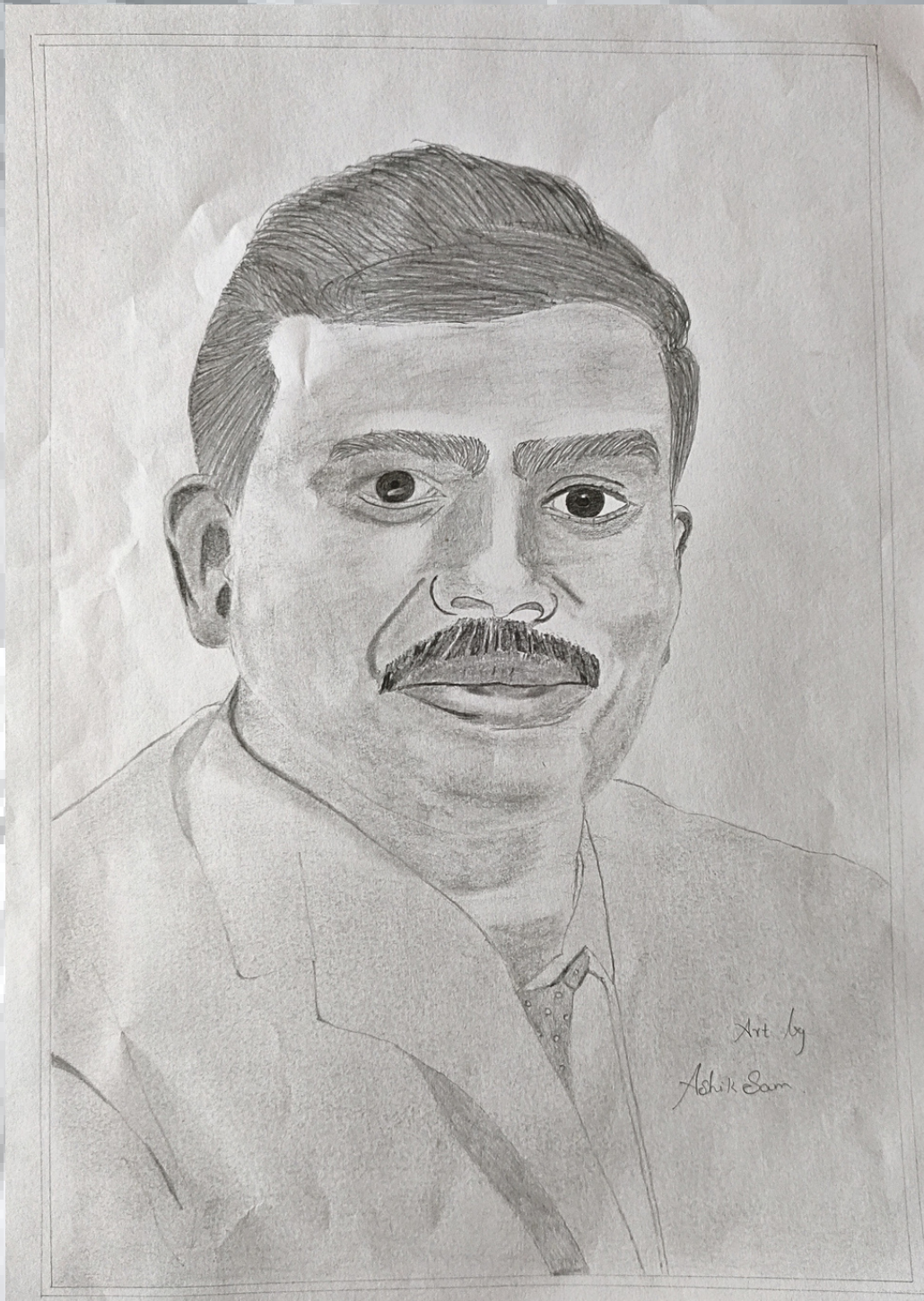
Mechanical engineering can lead to a fulfilling career with growth opportunities and a chance to make a positive impact on society and the environment.

**IHSAAN HUSSEIN.M**  
**3rd YEAR**  
**MECHANICAL - A**



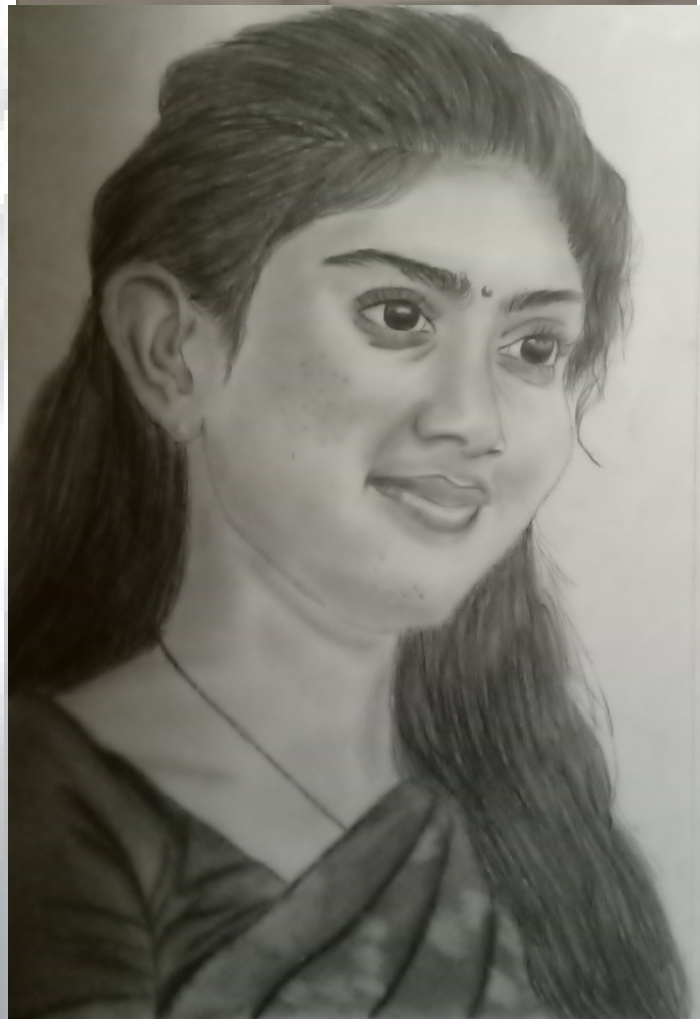
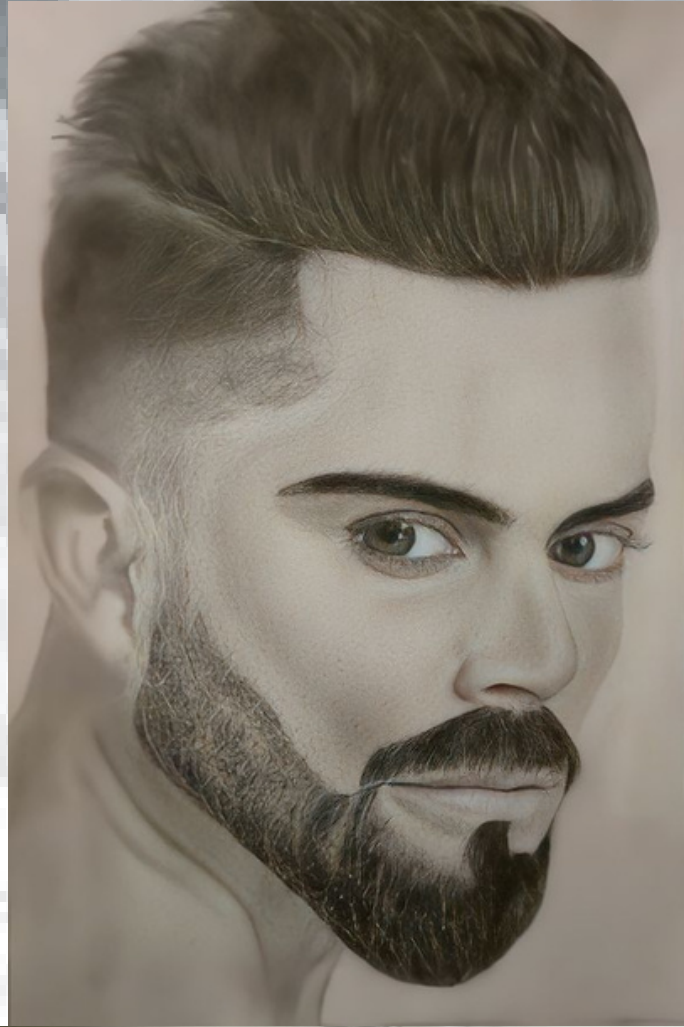


**DRAWINGS**



**ASHIK SAM.Y.S**  
**3rd YEAR**  
**MECHANICAL - A**







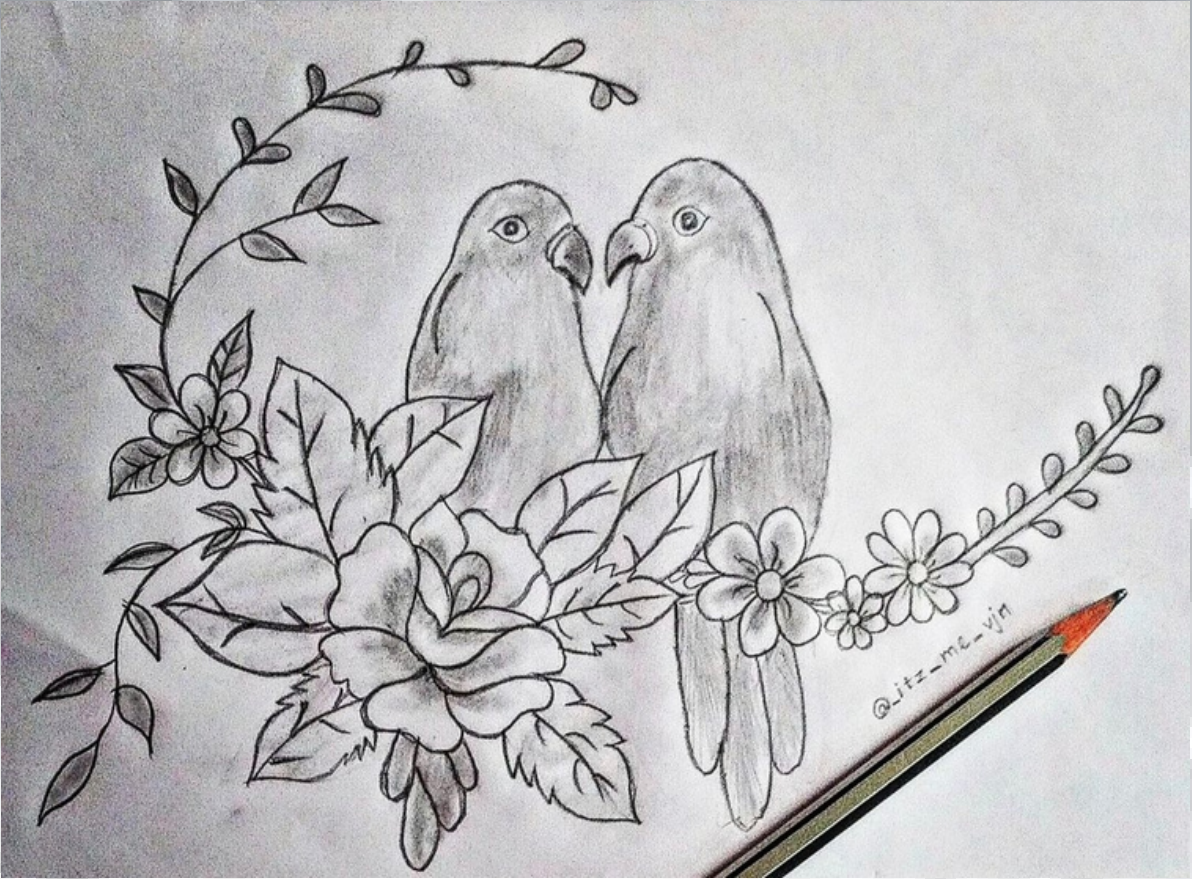


**VIKRAMAN J**  
**4TH YEAR**  
**MECHANICAL - C**









**VIJAYAN.K**  
**4th YEAR**  
**MECHANICAL - C**

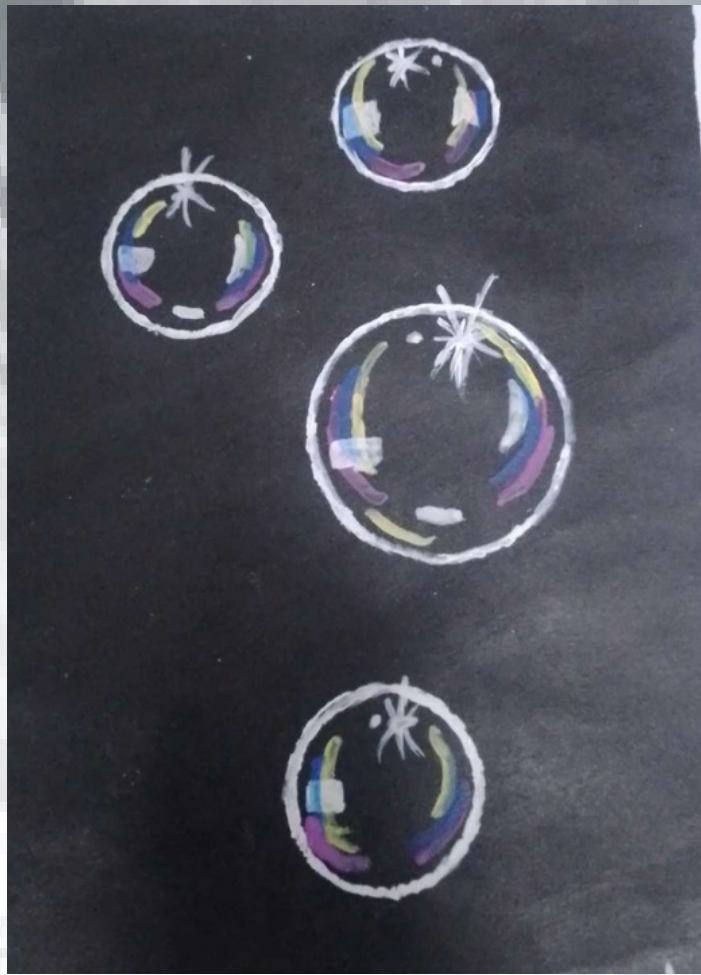




**KARTHICK. T**  
**2nd YEAR**  
**MECHANICAL - B**









**ABHIMANYU**  
**2nd YEAR**  
**MECHANICAL - A**

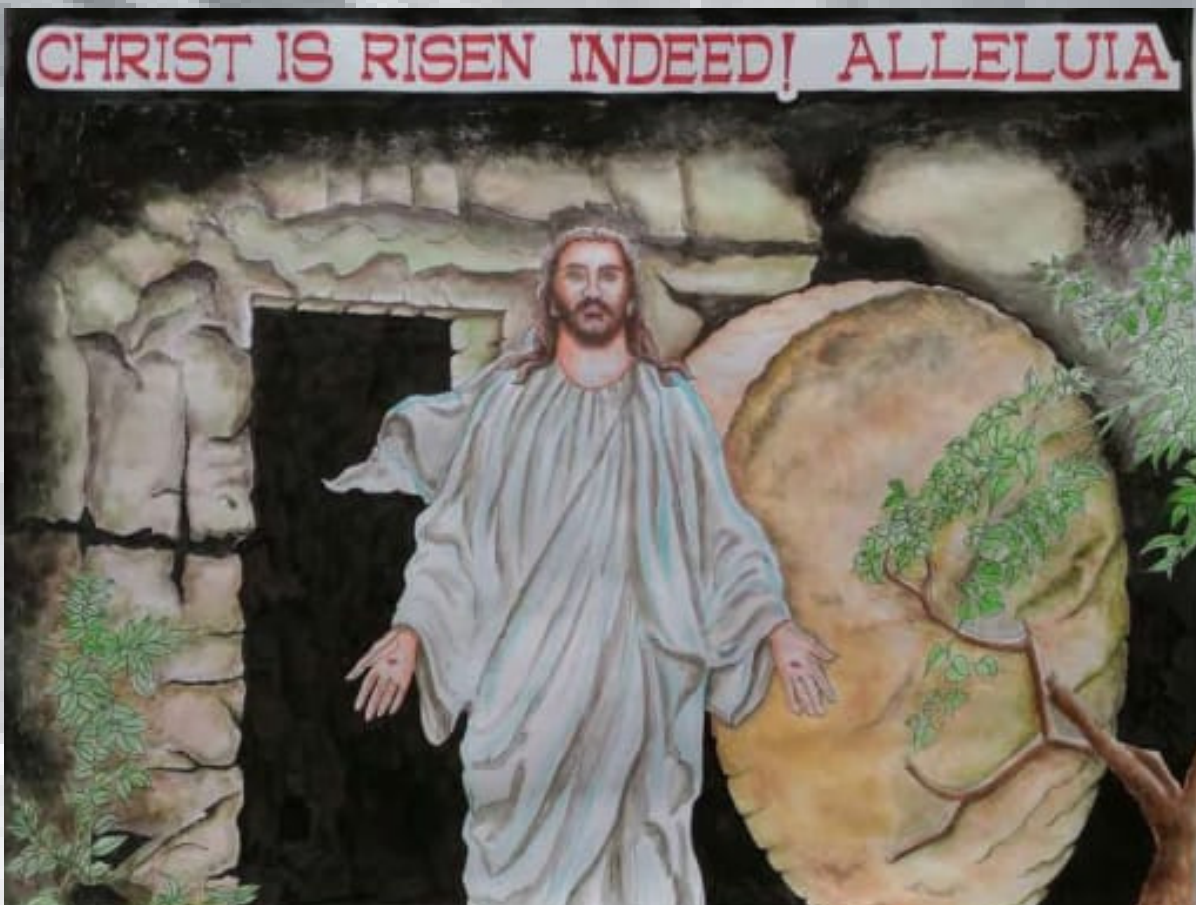












**YUVANJITH.R**  
**3rd YEAR**  
**MECHANICAL - C**





# ROHINI

COLLEGE OF ENGINEERING & TECHNOLOGY

Approved by AICTE and Affiliated to Anna University (An ISO Certified Institution) | Accredited by NAAC with A+ Grade  
Recognized under section 2(f) of University Grants Commission, UGC Act 1956

(AUTONOMOUS)

COUNSELLING  
CODE

**4670**



## COURSES OFFERED

### UG PROGRAMMES

#### B.E

- BIOMEDICAL ENGINEERING
- CIVIL ENGINEERING
- COMPUTER SCIENCE AND ENGG
- COMPUTER SCIENCE AND ENGG (AI & ML)\*
- ELECTRONICS AND COMMUNICATION ENGG
- ELECTRICAL AND ELECTRONICS ENGG
- MECHANICAL ENGINEERING

#### B.TECH

- AGRICULTURAL ENGINEERING
- ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

#### M.C.A

- MASTER OF COMPUTER APPLICATIONS

### RESEARCH PROGRAMME

#### Ph.D

- MECHANICAL ENGINEERING

### PG PROGRAMMES

#### M.E

- COMMUNICATION SYSTEMS
- COMPUTER SCIENCE AND ENGG
- THERMAL ENGINEERING
- CONST. ENGINEERING AND MGMT
- EMBEDDED SYSTEMS\*
- INDUSTRIAL SAFETY ENGINEERING\*

### MANAGEMENT PROGRAMMES

#### M.B.A

- OPERATIONS MANAGEMENT
- MARKETING MANAGEMENT
- FINANCIAL MANAGEMENT
- SYSTEMS MANAGEMENT
- HUMAN RESOURCE MANAGEMENT
- LOGISTICS & SUPPLY CHAIN MGMT

### INTEGRATED M.B.A

#### B.B.A-M.B.A\*

**ADMISSION  
HELPLINE**

**+91 85310 88888 | +91 98942 98888  
+91 82200 66888 | +91 83448 83888**

Near Anjugramam Junction, Kanyakumari Main Road, Kanyakumari Dist - 629401, Tamil Nadu.

E-mail : [admissions@rcet.org.in](mailto:admissions@rcet.org.in) | Web : [www.rcet.org.in](http://www.rcet.org.in)

**LEARN TODAY FOR BETTER  
TOMORROW....**



**ROHINI**

**COLLEGE OF ENGINEERING & TECHNOLOGY**

**Approved by AICTE and affiliated to Anna university. (An ISO Certified Institution)**

**Accredited by NAAC with A+ Grade | Recognized under section 2(f) of University Grands Commision, UGC Act 1956**

**(AUTONOMOUS)**

**Near Anjugramam Junction Main Road, Palkulam, Variyoor P.O - 629401  
Kanyakumarin District, Tamil Nadu.**

**Nob: 98942 18888, 98942 98888, 82200 66888 | Ph: 04652 266665, 266288**

**E-mail: [admin@rcet.org.in](mailto:admin@rcet.org.in) | Website: [www.rcet.org.in](http://www.rcet.org.in)**