

# THE INFINITY

JANUARY-DECEMBER, 2025

VOLUME 2

BE

CREATIVE



**Department of Basic Sciences**

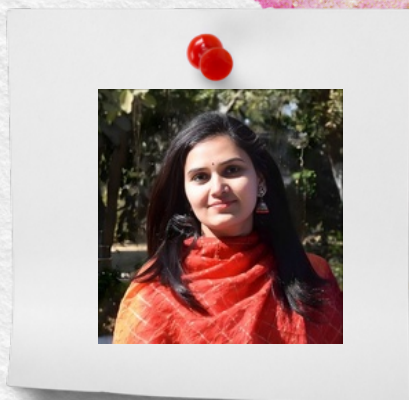
UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR



ISBN: 978-93-5469-964-1



# Editor's Note



**Dr. Pallavi Malik**  
**Associate Professor,**  
**Mathematics**  
*Chief Editor*

We are thrilled to introduce “The Infinity”, the Volume 2 edition of the official magazine of the Department of basic sciences at UEM Jaipur. This publication highlights the talent, innovation, and academic excellence that characterize our department.

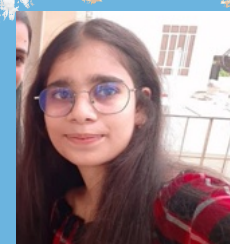
We hope “The Infinity” inspires, informs, and fuels your passion for learning and discovery. Thank you for your support, and we eagerly welcome your feedback as we strive to make “The Infinity” a truly enriching and impactful publication.

Explore a rich blend of articles on groundbreaking scientific and mathematical topics, including quantum mechanics, sustainable energy, advanced calculus, and applied mathematics. Paired with highlights from thought-provoking seminars, innovative research, and mathematical explorations led by our students and faculty.

## ***Student Editors***



**Punit Kumar**  
**B.Tech [CSE] 1st year**  
**12025002001016**



**Tanuja Kumawat**  
**B.Tech [CSE] 1st year**  
**12025002026006**



# **THE** **INFINITY**

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**January-December, 2025 | VOL.02**

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**UNIVERSITY OF ENGINEERING & MANAGEMENT**  
**Good Education, Good Jobs**

**Published By:**  
**Department of Basic Sciences, UEM Jaipur**  
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# Message from the Vice-Chancellor



It is with immense pride and joy that I extend my heartfelt congratulations to the Department of Computer Applications on the launch of the second volume of their magazine, “The Infinity”. This milestone is a testament to the creativity, dedication, and collaborative efforts of students and faculty alike. In today’s rapidly evolving digital era, such initiatives play a pivotal role in shaping perspectives and inspiring innovation within the academic community.

The field of Computer Applications has been at the forefront of revolutionizing industries, creating transformative solutions, and connecting the world like never before. At the University of Engineering & Management, Jaipur, we believe in nurturing talents that not only excel academically but also push boundaries of what is possible. A platform like “The Infinity” serves as a beacon, reflecting the unique ideas and aspirations of its contributors and providing readers with a glimpse into the vibrant academic culture of the department.

I encourage all students and faculty members to continue their journey of exploration and learning with the same passion and zeal. Let “The Infinity” be a source of motivation and a repository of inspiration for future generations. Your work today lays the foundation for tomorrow’s breakthroughs and serves as a reminder of the incredible potential that resides within our institution.

May this magazine mark the beginning of many more achievements for the Department of basic sciences. As we move forward, let us remain committed to excellence and innovation, ensuring that UEM Jaipur continues to shine as a center of academic and intellectual brilliance. My best wishes to the entire team behind “The Infinity” and to all those who strive to make a difference in this ever-changing world.

With gratitude

**Prof. (Dr.) Biswajoy Chatterjee**

Vice-Chancellor, University of Engineering & Management (UEM), Jaipur



# Message from the Registrar



It is with immense pride and joy that I extend my heartfelt congratulations to the Department of Computer Applications on the release of the second edition of “The Infinity”. This magazine stands as a testament to the creativity, dedication, and collaborative spirit of the students, faculty, and staff who have worked tirelessly to make this vision a reality. In an institution like ours, where academic pursuits meet innovation, “The Infinity” provides a unique platform to highlight the diverse talents and groundbreaking ideas that emerge from the department. It reflects the vibrant intellectual culture of the University of Engineering & Management, Jaipur, and showcases how our community is shaping the future of technology and society through rigorous learning and impactful contributions.

I believe The Infinity goes beyond being just a magazine—it symbolizes the holistic development of our students. It captures their ability to think critically, communicate effectively, and innovate boldly. This initiative also celebrates the dedication of the faculty, who continuously guide and inspire young minds to push boundaries. My heartfelt congratulations to the editorial team and contributors for their efforts in bringing this vision to life. May “The Infinity” grow as a source of inspiration, motivating readers to embrace a culture of excellence and innovation.

With utmost regards

**Prof. (Dr.) Pradeep Kumar Sharma**

Registrar & HOD Physics ,

University of Engineering & Management

(UEM), Jaipur

A handwritten signature in dark ink, appearing to be 'P.K.S.' with a stylized flourish.

# Message from the Associate Dean

## (Academics & Foreign Relations)



It is a privilege to address the readers of “The Infinity”, the second edition of the Department of Computer Applications’ magazine. This initiative reflects the department's unwavering commitment to academic excellence and global engagement. In today’s fast-evolving world, where technology serves as the backbone of progress, nurturing intellectual curiosity and fostering international perspectives is essential. This magazine is a step toward achieving these goals, showcasing the talents, insights, and innovative ideas that drive

I have witnessed the dedication and diligence of the department in equipping students with not just knowledge but also the ability to adapt and excel in dynamic environments. The articles, projects, and creative expressions featured in “The Infinity” reflect this spirit of learning and growth. The magazine is not merely a collection of words but a celebration of academic accomplishments, collaborative efforts, and a shared vision for a brighter future.

At the same time, I am delighted to see how such initiatives can help connect our students and faculty to global audiences. Knowledge transcends borders, and I believe that “The Infinity” will act as a bridge, sharing the achievements of the Department of Computer Applications with the wider academic and professional community, fostering cross-cultural collaborations, and promoting our institution’s global outlook.

My heartfelt congratulations to the editorial team and contributors for their hard work and dedication in bringing this magazine to life. May “The Infinity” inspire, educate, and open doors to endless opportunities, encouraging its readers to dream big and strive for greatness.

Best regards

**Prof. (Dr.) Mukesh Yadav**  
Associate Dean (Academics & Foreign Relations),  
University of Engineering & Management (UEM),  
Jaipur



# Message from the HOD

## (Mathematics)



The Department of Mathematics is one among those that were established during the inception of the University of Engineering and Management. Over the years, we have established ourselves as leaders in Pure and Applied Mathematics, demonstrating excellence in a short span.

Our faculty members are renowned researchers, regularly publishing papers in international journals with good reputations. They impart strong theoretical foundations and practical skills to our students, equipping them with a deep understanding of mathematical concepts.

As Mathematics and Statistics form the bedrock of scientific and engineering knowledge, our primary focus is on producing engineers well-versed in modern mathematical tools and adept at tackling real-world problems. We strive to cultivate analytical and logical skills in our students through outcome-based teaching-learning practices, empowering them to excel as future engineers and researchers.

It gives me great pleasure, on behalf of the Mathematics Department, to offer my best wishes to the entire editorial team, contributors, and all those involved in this endeavor. May this magazine thrive as a beacon of knowledge and creativity, inspiring countless students for years to come.

Best regards

Prof. (Dr.) Praphull Chhabra

Professor and Head

Department of Mathematics

A handwritten signature in blue ink, appearing to read 'Praphull Chhabra'.

# Message from the HOD

(Chemistry)



It gives me immense pride and great pleasure to witness the Department of basic sciences taking this monumental step in launching the second edition issue of their magazine. This initiative is truly commendable, as it opens up new horizons for our students to explore their creative potential, articulate their thoughts, and engage in the joy of intellectual expression.

This magazine will undoubtedly serve as a powerful platform to inspire young minds, encouraging them to think critically, write passionately, and share their innovative ideas. It reflects the department's commitment to fostering a culture of academic excellence and creative exploration, which is vital for the holistic development of our students.

I would like to extend my heartfelt congratulations to the Department of basic sciences for embarking on this inspiring journey. I am confident that this magazine will not only showcase the talent and intellect of our students but also motivate them to continuously learn, grow, and contribute meaningfully to the academic and scientific communities.

On behalf of the Chemistry Department, I offer my best wishes to the entire editorial team, contributors, and all those involved in this endeavor. May this magazine thrive as a beacon of knowledge and creativity, inspiring countless students for years to come.

Best regards

**Dr. Anamika Khaskel**

Associate Professor and Head

Department of Chemistry

A handwritten signature in black ink that reads "Anamika Khaskel". The signature is written in a cursive, flowing style.



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**THE INFINITY**

# **3<sup>rd</sup> International Conference on Computational Applied Sciences & it's Applications ( ICCASA-2025 )**

**September 20th - 21th,2025**



The 3rd International Conference on Computational Applied Sciences and its Applications (ICCASA 2025) was successfully organized by the University of Engineering and Management (UEM), Jaipur, on 20–21 September 2025 in hybrid mode.

The conference witnessed the participation of over 150 delegates from across the globe in both the mode, including research scholars, academicians, and industry professionals. The inaugural ceremony was graced by Prof. Banani Chakrabarti (Chancellor, UEM Jaipur), Prof. (Dr.) Biswajoy Chatterjee (Vice-Chancellor, UEM Jaipur), Prof. (Dr.) Satyajit Chakrabarti (Pro Vice-Chancellor, UEM Jaipur), Prof. (Dr.) Pradeep Kumar Sharma (Registrar, UEM Jaipur), Associate Deans of UEM Jaipur, along with other eminent dignitaries from different parts of the country.



Across two days, the conference featured twelve keynote talks by distinguished national and international experts, who shared insights into emerging research trends in Physics, Chemistry, and Mathematics. In addition, nearly 101 academicians presented their research papers highlighting diverse applications of computational and applied sciences.



The valedictory session was held on 21 September 2025 at 5:00 PM, where the conveners, Dr. Praphull Chhabra and Dr. Tarun Sharma, presented a comprehensive report on the conference. Participants expressed their appreciation for the enriching sessions and valuable networking opportunities.



The selected full-length articles presented at ICCASA 2025 will be published in the AIP Conference Proceedings (Scopus-indexed) and the journal Applications and Applied Mathematics (ESCI). The event concluded with a formal vote of thanks by the convener Dr. Praphull Chhabra.



# World Photography day Event

19<sup>th</sup> August 2025

Every year on 19<sup>th</sup> August, we celebrate World Photography Day - a day to honor the art, history and magic of photography. This year PicXL Photography club of UEM Jaipur urged everyone to share that one picture that captures a memory, an emotion or a story that words can't describe. Through these photos from of our college, we hope to give you a glimpse of our moments - candid laughs, everyday life, friendships and memories frozen in time.





# **Faculty Development Programme On "Integrated Computational Mathematics, Data Science And Statistical Modelling ( FDP-ICMDSM)"**

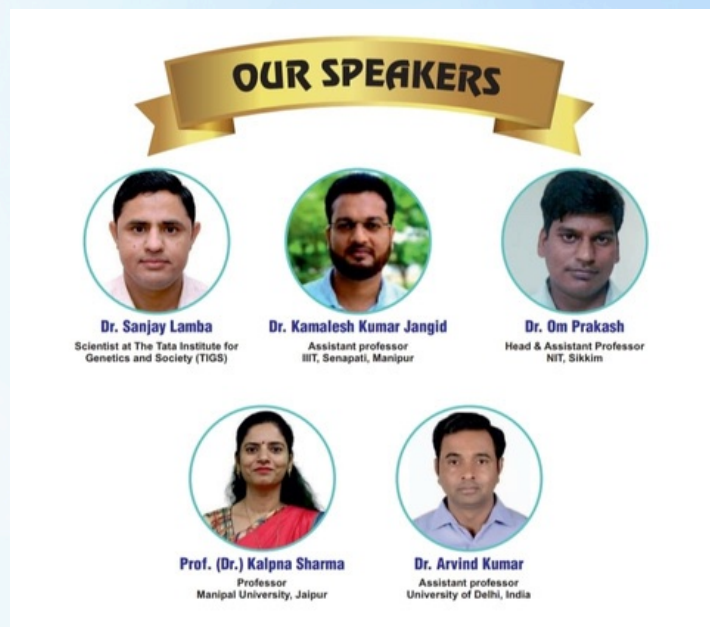
**08-12 December, 2025**

## **About the FDP**

The Faculty Development Programme on Integrated Computational Mathematics, Data science and Statistical Modelling equips faculty with modern analytical, computational, and modelling skills for real-world problem solving. It emphasizes data-driven methods, simulation techniques, and quantitative reasoning through expert sessions and hands-on activities. The programme strengthens teaching, research capabilities, and interdisciplinary applications in contemporary computational and statistical domains.

## **Objectives of FDP**

- To develop competency in computational mathematics and data-driven analytical methods.
- To strengthen skills in statistical and mathematical modelling for real-world applications.
- To support the integration of advanced quantitative methods into teaching and curriculum design.
- To enhance research capability using modern computational and simulation tools.
- To promote interdisciplinary thinking and problem-solving through modelling approaches.



# Our Esteemed Faculty

| SR. | Name                      | Designation                           | Experience | Area of Research                                                                                                                                                                                                                                           |
|-----|---------------------------|---------------------------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | Dr. Praphull Chhabra      | Professor Mathematics                 | 15 years   | Information Measures, Inequalities and Fuzzy Divergence                                                                                                                                                                                                    |
| 2.  | Dr. Tarun Sharma          | Professor Mathematics                 | 11 years   | <b>Major area :</b> Fluid Dynamics<br><b>Subfields :</b><br>1. Analysis of Heat and Mass Transfer in different industrial and engineering domains.<br>2. Mathematical Modeling of Nanofluids flows in the diverse engineering and industrial fields.       |
| 3.  | Dr. Pallavi Malik         | Associate Professor Mathematics       | 11 years   | Fluid Dynamics, Conducting Fluids, Plasma Dynamics, Computational Fluid Dynamics, Electrical Systems                                                                                                                                                       |
| 4.  | Dr. Anamika Khaskel       | Associate Professor and HOD Chemistry | 8.5 years  | Synthetic organic chemistry, Catalysis, Multicomponent Reactions                                                                                                                                                                                           |
| 5.  | Dr. Arnab Palui           | Associate Professor physics           | 11 years   | <b>Major Area:</b> Condensed Matter Physics<br><b>Subfield:</b><br>1. Investigation of ion dynamics in mixed network former glasses.<br>2. Structural, thermal and electrical characterization of amorphous materials and structure-transport correlation. |
| 6.  | Dr. Kavita Jat            | Assistant Professor Mathematics       | 01 year    | Fluid Flow, Heat and Mass transfer, Boundary layer Problems                                                                                                                                                                                                |
| 7.  | Mr . Manish Jangir        | Lab Technician Physics                | 07 years   |                                                                                                                                                                                                                                                            |
| 8.  | Mr. Kamal Kishore Kumawat | Lab Assistant Chemistry               | 04 years   |                                                                                                                                                                                                                                                            |



# Faculty Publication

## Dr. Tarun Sharma

- **Paper Publication:**

Radiative heat transfer and thermo-diffusion effects in chemically reactive magnetized mixed convective flow of gold nanofluid, Source Type: Journal Publisher: World Scientific. ,<https://doi.org/10.1142/S1793292025500134> , Document Type: Article

- **Book publication:**

Title: Discrete Mathematics: Theory and Applications

Publisher: H.S.R.A. Publication (Bangalore ,India)

Date of publication: 9 June 2025 ISBN: 9789368500032

Online links: <https://amzn.in/d/hU4jidp>

- **Webinar/Seminar: Invited talk/Conference**

1. One day Career Counselling Session organized by PM Shri Government Senior Secondary School, Meenawala, Jaipur ( Rajasthan). on 11 January 2025.
2. Reviewer in 5<sup>th</sup> international conference on Navigating Complexity: Harnessing Technology and Innovation for Sustainable Growth organized by Poornima University, Jaipur on March 18-19, 2025.

## Dr. Praphull Chhabra

- **Paper Publication:**

1. Ø Chhabra, P., & Chhabra, S. (2025). A synopsis of fuzzy set theory. In Mathematics and Computer Science for Real-World Applications. Scrivener Publishing. <https://www.scrivenerpublishing.com/cart/title.php?id=1161>, Scopus book chapter.

- **Book publication:**

1. Title of the book: Fundamental Mathematics (Volume II)

ISBN: 978-620-7-48723-3

Pages: 192

Publisher: LAP Lambert Publishing, United Kingdom

Date of Publication: 06/01/2025

Links: <https://amzn.in/d/hoTAoKp>

<https://www.morebooks.shop/shop-ui/shop/product/978-620-7-48723-3>

## Dr. Arnab Palui

- **Workshop event conducted:**

1. 3 Days workshop for PicXL photography club.
2. World Photography day event by PicXL.
3. Techfest event MegaPicxl and FPS.

**Dr . Kavita Jat**

- **Paper Publication**

Publisher: Elsevier

Journal Name: International Journal of Thermofluids

Abstracting and indexing: Scopus, SCImago Journal Rank (SJR), SNIP

Quartile: Q1

DOI: <https://doi.org/10.1016/j.ijft.2025.101467>

**Dr. Anamika Khaskel**

- **Paper Publication**

A Sustainable and Green Approach to the Preparation of Hantzsch-1, 4-Dihydropyridines Using Phytic Acid Catalysis

Anamika Khaskel, Santosh Kumari Bajiya, Rakesh Kumar Sharma

Publication date: 2025/5/4, Journal: Organic Prep. Proc. Int.; Volume 57, issue Organic Preparations and Procedures International, Pages 218-227 (Volume 57, 2025 - Issue 3) (SCIE)

**PhD student achievement**

PhD student Mr. Rakesh Kumar Sharma was invited in Royal Society of Chemistry, Editorial Meet for poster presentation (Will be held on 19 th Nov 2025), BITS Pilani, Jaipur



# Research Visibility

| SR. | Supervisor           | Scholar                   | Title                                                                                                     |
|-----|----------------------|---------------------------|-----------------------------------------------------------------------------------------------------------|
| 1   | Dr. Anamika Khaskel  | Ms. Santosh Kumari Bajiya | Synthesis of Substituted 1,4 - dihydropyridines                                                           |
|     |                      | Mr. Rakesh Kumar Sharma   | Synthesis of seleno-substituted heterocycles                                                              |
|     |                      | Ms. Afsana Fazal          | Synthesis of indole substituted heterocycles                                                              |
| 2   | Dr. Praphull Chhabra | Ms. Sonam Chhabra         | Information Divergence Measures And its Applications                                                      |
|     |                      | Mr. Devendar Kumar        | Development of Sustainable Inventory Policies for Deteriorating Items under Controllable Carbon Emissions |
| 3   | Dr. Tarun Sharma     | Mr. Ashok Kumar Yadav     | To be finalized                                                                                           |
| 4   | Dr. Kavita Jat       | Mr. Mukesh Kumar Mahala   | A study of Generalized Hypergeometric Function and it's Applications in various Disciplines               |

The page is framed by a decorative border of various science and engineering icons. These include a magnifying glass, a molecular structure, a battery, a beaker, a lightbulb, a test tube, a microscope, a pair of safety goggles, and an atom model. The icons are scattered around the central text, with some appearing multiple times. The background is a light gray grid.

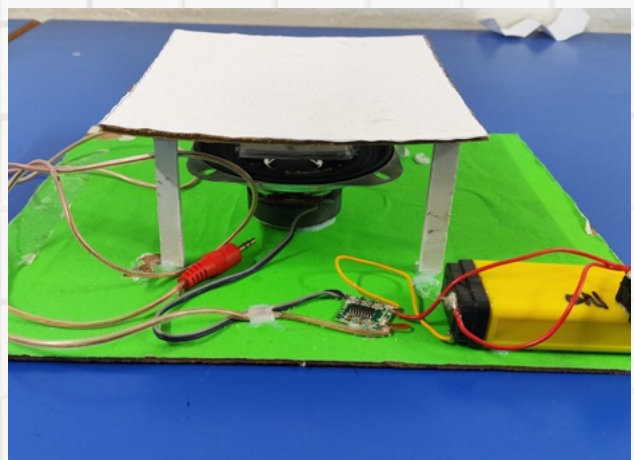
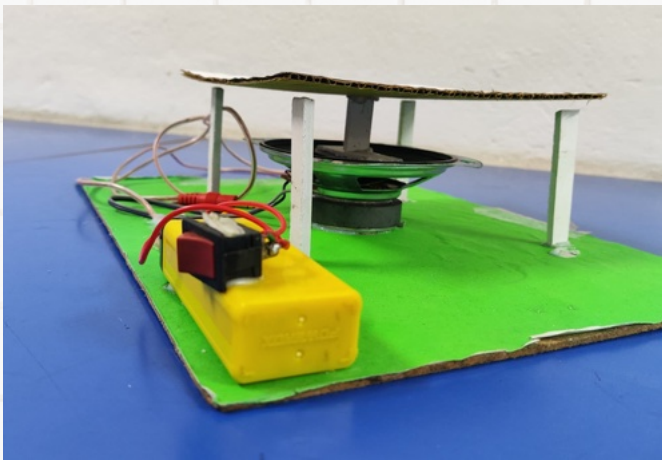
# STUDENT PROJECTS

Hands-on projects in physics are crucial for first-year engineering students as they bridge theoretical concepts with real-world applications. These projects foster a deeper understanding of physical principles through experimentation and problem-solving. They also develop critical skills such as teamwork, creativity, and technical proficiency, preparing students for practical challenges in engineering fields. Engaging in such projects ignites curiosity and helps students appreciate the relevance of physics in engineering innovation. The first year engineering students showcased remarkable creativity and teamwork by building hands-on projects that explored innovative technologies. They developed a solar car, leveraging renewable energy principles, a magnetic perpetual motion machine that demonstrated fascinating physical phenomena, a maglev train utilizing magnetic levitation for frictionless motion, and a cymatic visualizer to visualize sound waves through vibrations in fascinating patterns etc. Students have also prepared a Telescope, a Tonoscope, a Perpetual motion Machine etc. as their lab project. These projects highlighted their enthusiasm for learning and problem-solving while applying theoretical concepts to practical challenges.



# CYMATIC VISUALIZER

A cymatic visualizer is a device or tool used to visually represent sound waves or vibrations through patterns created in a medium such as water, sand, or other materials. It is based on the principles of cymatics, a field that studies the visualization of sound and vibration.



## Working Principle:

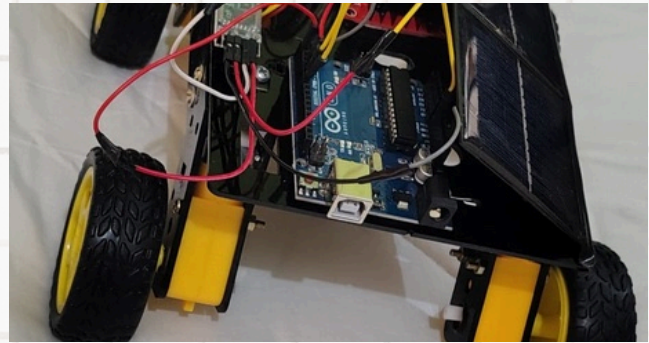
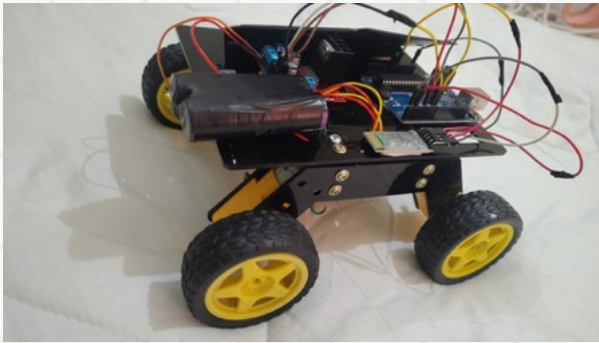
1. **Sound Input:** A sound source, such as a speaker or oscillator, generates sound waves.
2. **Medium Interaction:** These waves are transmitted to a physical medium (e.g., water, sand, or a metal plate).
3. **Pattern Formation:** As the medium vibrates, it forms standing wave patterns (such as Chladni figures) due to the interaction of sound frequencies and resonance.
4. **Visualization:** These patterns can be observed as intricate geometric shapes or dynamic motion, often correlating with the frequency and amplitude of the sound.

Cymatic visualizers demonstrate how sound frequencies can influence matter, offering a unique intersection of science and art.



# SOLAR CAR

A solar car is a vehicle powered by solar energy, typically developed in laboratories or research centers to explore sustainable transportation. Solar panels on the car's surface capture sunlight and convert it into electricity using photovoltaic (PV) cells. This electricity charges a battery or directly powers an electric motor to drive the car.



## Working Principle:

1. **Solar Energy Capture:** Sunlight strikes the PV cells in the solar panels, generating direct current (DC) electricity via the photovoltaic effect.
2. **Energy Storage:** The generated electricity charges a battery, ensuring energy is available even when sunlight is insufficient.
3. **Electric Motor:** The stored energy powers an electric motor, converting electrical energy into mechanical energy to drive the wheels.
4. **Control System:** A microcontroller regulates power distribution, optimizing performance and ensuring efficient energy use.

Solar cars highlight the potential for renewable energy in transportation and are often used in academic and competitive environments.



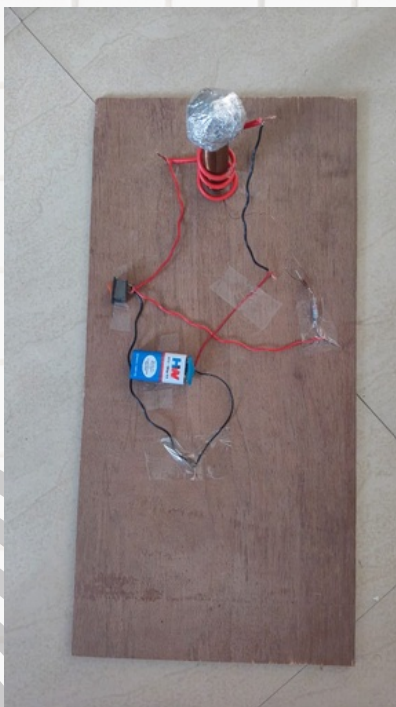
# TESLA COIL

A Tesla coil is an electrical resonant transformer circuit invented by Nikola Tesla, designed to produce high-voltage, low-current, high-frequency alternating current (AC) electricity. It is often used for demonstrations, wireless power experiments, and understanding electromagnetic induction and resonance principles.



## Working Principle:

- 1. Power Supply:** An external AC power source energizes the primary circuit, which typically includes a capacitor and a primary coil.
- 2. Resonant Circuit:** The capacitor charges and discharges rapidly through the primary coil, creating an oscillating magnetic field.
- 3. Electromagnetic Induction:** This oscillating magnetic field induces a very high voltage in the secondary coil due to resonance between the primary and secondary circuits.
- 4. High-Voltage Discharge:** The secondary coil produces extremely high voltages (up to several hundred thousand volts), visible as electrical arcs or sparks at the top terminal.

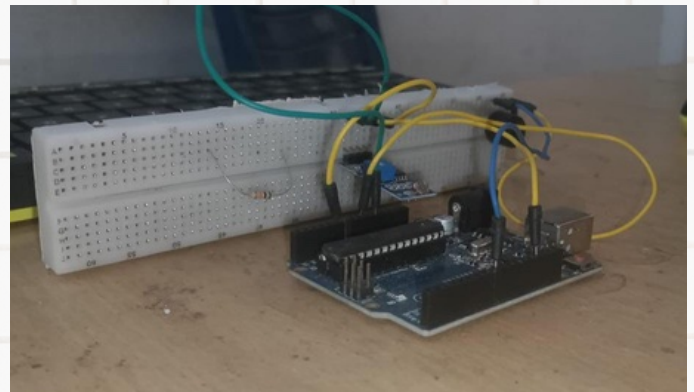
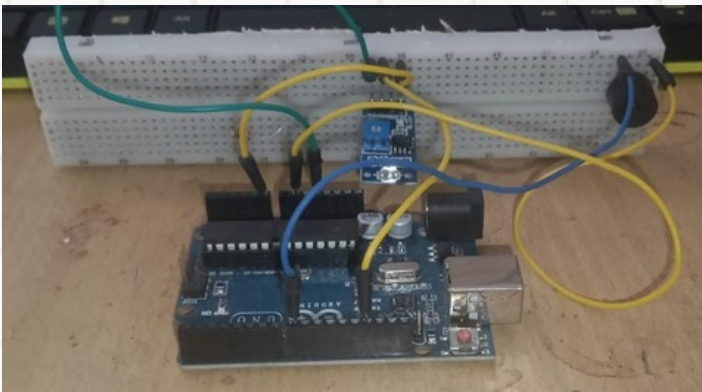


Tesla coils demonstrate the principles of resonance, wireless energy transmission, and high-frequency electromagnetism, making them popular educational and experimental projects in physics and electrical engineering.



# LASER ALARM SYSTEM

A laser alarm system is a security project that uses a laser beam and a light sensor to detect unauthorized entry or motion. When the laser beam is interrupted, the system triggers an alarm, alerting users to potential intrusion. Such systems are widely used for safety, surveillance, and home security demonstrations.



## Working Principle:

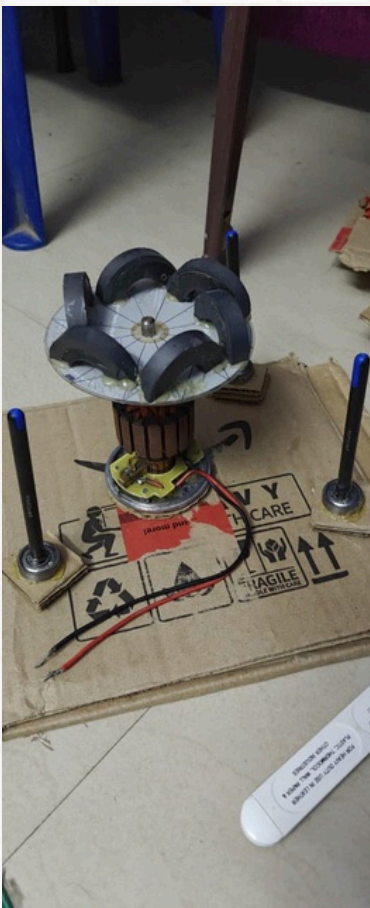
- 1.Laser Source:** A laser diode emits a narrow, focused beam of light directed toward a light-dependent resistor (LDR) or photodiode.
- 2.Beam Detection:** Under normal conditions, the sensor continuously receives the laser beam, maintaining a stable signal.
- 3.Interruption Detection:** When an object or person crosses the laser path, the beam is blocked, causing a sudden change in the sensor's output.
- 4.Alarm Activation:** The change is detected by a control circuit (often involving a microcontroller or transistor setup), which activates a buzzer or siren to alert the user.

The laser alarm system demonstrates the principles of optical sensing, signal interruption, and electronic control, making it a popular project for understanding basic security and automation technologies.



# Perpetual Motion Machine Using Magnets

Ø A perpetual motion machine using magnets is a conceptual project that aims to demonstrate continuous motion through magnetic repulsion and attraction forces. Although true perpetual motion (motion without energy loss) is impossible according to the laws of thermodynamics, this project serves as an educational model to study magnetic interactions, energy conversion, and rotational dynamics.



## Working Principle:

- 1. Magnetic Arrangement:** Permanent magnets are strategically positioned on a rotating disc and a stationary base to create alternating poles that exert repulsive and attractive force.
- 2. Magnetic Force Interaction:** The repulsive magnetic forces between like poles push the rotor, initiating rotational motion.
- 3. Rotor Assemble:** The rotor, mounted on bearings, spins due to the magnetic force imbalance, demonstrating sustained motion for a short period before friction and air resistance slow it down.
- 4. Energy Observation:** The system helps visualize how magnetic fields can induce motion and how energy losses (due to friction and eddy currents) prevent true perpetual motion.

This project illustrates the principles of magnetism, rotational mechanics, and energy conservation, making it a fascinating experiment for understanding the limits of magnetic propulsion and the laws governing motion and energy.



AWA



*Awards for Research, Innovations,  
Teaching and Excellence*



# ARTICLES



# THE POWER OF LOGIC



**Dr. Tarun Sharma**  
**Professor, Mathematics**

Logic is the backbone of clear thinking, and this year, our students discovered how powerful it truly is. Through lessons, discussions, and problem-solving activities, they learned that logic is not just used in mathematics or science—it is a skill that strengthens decision-making in everyday life. Each step in logical reasoning taught them to think before reacting and to understand problems before attempting solutions.

As we explored logical concepts, students understood how reasoning helps break complex ideas into simpler, manageable parts. Whether they were solving equations, analyzing statements, or drawing conclusions from patterns, logic gave them the tools to approach challenges systematically. This structured way of thinking helped them see that even the most confusing tasks become easier when handled step by step.

One of the most important lessons learned was that logic removes guesswork. Instead of relying on luck or assumptions, students discovered the value of evidence, observation, and clear reasoning. This shift not only improved their academic performance but also changed the way they approached real-life situations. Logical thinking prepared them to make smarter choices and avoid unnecessary mistakes.

Throughout the year, students also realized that logic builds confidence. When they followed a chain of reasoning and arrived at the right conclusion, it strengthened their belief in their own abilities. Logical thinking empowered them to trust their mind, question information, and understand concepts at a deeper level. With every solved problem, their confidence grew.

As we reflect on this journey, it becomes clear that the power of logic extends far beyond the classroom. It shapes thoughtful learners, responsible individuals, and strong problem-solvers. By embracing logical thinking, students are now better equipped to face academic challenges and navigate life with clarity and purpose. Their journey with logic this year has prepared them well for the decisions and opportunities ahead.



# JOURNEY THROUGH NUMBERS

**Dr. Praphull Chhabra**  
**Professor, Mathematics**



Mathematics has always been more than a subject; it is a language that helps us understand the world in its purest form. This year, our journey through numbers allowed us to explore how logic, patterns, and problem-solving come together to create a meaningful learning experience. Each concept we encountered opened a door to new ways of thinking.

As students moved from basic arithmetic to more complex topics, they began to realize that mathematics rewards patience and curiosity. Algebra taught us to find the unknown with confidence, geometry helped us visualize shapes and structures, and statistics showed us the importance of data in our daily lives. Through every chapter, numbers quietly trained our minds to reason clearly and think ahead.

One of the most inspiring parts of this journey was watching students grow past the fear of “difficult problems.” Many began the year unsure of their abilities, but gradually, with practice and guidance, they discovered that perseverance can turn confusion into clarity. Every solved equation became proof that determination is stronger than doubt.

Beyond academics, the journey through numbers also revealed how mathematics connects to real life. Whether calculating budgets, understanding technology, or recognizing patterns in nature, students learned that numbers are present everywhere. This realization helped them appreciate mathematics not as a school requirement, but as a lifelong skill that supports smart decision-making.

As the year concludes, we celebrate not just the marks scored, but the mindset developed. This journey has shaped students into logical thinkers who are not afraid to challenge themselves. With sharper reasoning and stronger confidence, they now stand prepared for future mathematical adventures and for the countless ways numbers will guide them in the years ahead.

# REFLECTIONS ON A YEAR OF GROWTH AND LEARNING



**Dr. Pallavi Malik**  
Associate Professor, Mathematics

As we reach the end of another academic year, it becomes meaningful to pause and reflect on the journey we have shared. This year has been more than a collection of classes, assignments, and exams; it has been a period of transformation. Students stepped into classrooms with curiosity, faced challenges with courage, and gradually built the confidence that comes only from consistent effort. Every lesson learned—whether easy or difficult—has contributed to an inner growth that cannot be measured solely by grades.

Throughout the months, we saw how learning is not limited to textbooks. It happened during group discussions, late-night revisions, practical experiments, and even in the quiet moments when a tough concept finally clicked. Students learned to think critically, communicate clearly, and collaborate meaningfully. These skills, developed patiently over time, have strengthened not just academic abilities but also the mindset needed to navigate life beyond college.

The year also reminded us of the importance of resilience. There were times of confusion, times when progress felt slow, and moments when giving up seemed easier. Yet, each student pushed forward, proving that growth often happens in the moments we don't notice. With every setback handled and every doubt overcome, they built a stronger version of themselves—one that is ready for greater challenges ahead.

As we look back, we celebrate not only what we achieved but also who we became. This year has taught us that learning is a continuous journey and growth is a quiet but powerful process. Carrying these lessons forward, we step into the future with hope, confidence, and a renewed belief in our potential. The chapters of this year may close, but the wisdom gained will continue to guide us for years to come.



# THE JAMES WEBB SPACE TELESCOPE – HUMANITY'S GOLDEN EYE TO THE BEGINNING OF TIME



Dr. Arnab Palui

Associate Professor, Physics

In the vastness of space, where stars are born and galaxies drift like islands in an endless ocean, a new explorer now peers into the unknown – the James Webb Space Telescope (JWST). Often called the successor to Hubble, this golden-eyed marvel represents humanity's boldest step in uncovering the secrets of the cosmos.

## **A Telescope Like No Other**

It all began with a dream – to look further than any telescope ever had, to see the first light that shone after the Big Bang. Launched on December 25, 2021, the James Webb Space Telescope traveled over a million kilometers from Earth to its silent home at the Lagrange Point 2 (L2), where sunlight, Earth, and moonlight would never disturb its vision.

Unlike Hubble, which sees mostly visible light, Webb observes the universe in infrared – the invisible glow of heat that reveals what the eye cannot see. With its enormous 6.5-meter golden mirror, made of 18 hexagonal segments, Webb can collect faint whispers of light that have traveled billions of years across the cosmos.

## **Unfolding Like a Work of Art**

When Webb reached space, it unfolded piece by piece like a delicate origami flower – its massive sunshield, as big as a tennis court, spread out to protect it from the Sun's heat. Below that shimmering barrier, the telescope cooled to temperatures close to  $-233^{\circ}\text{C}$ , ready to capture the faintest flickers of ancient galaxies. Every detail was precise; even a single mistake could have doomed the mission. But when the first images arrived, the world gasped – a breathtaking tapestry of galaxies, nebulae, and stars glittering in colors never seen before.

## **Windows to the Early Universe**

With Webb's extraordinary vision, astronomers are now looking back in time – to when the first stars and galaxies were born. Its infrared eyes have revealed galaxies that existed just a few hundred million years after the Big Bang, allowing us to witness the universe's childhood.

But Webb doesn't just look outward – it looks inward, too. It has studied planets orbiting distant stars, detecting water vapor, carbon dioxide, and methane in their atmospheres. One day, these discoveries could bring us closer to answering the age-old question: Are we alone in the universe?

## **A Bridge between Science and Wonder**

The James Webb Space Telescope is more than just a scientific instrument – it is a symbol of human curiosity and creativity. Built through decades of collaboration among NASA, ESA, and CSA, it reminds us of what we can achieve when we reach for the stars together.

Webb doesn't just study the universe; it tells its story – a story of light, time, and endless wonder. Every image it sends back is a chapter written in the language of the cosmos, waiting for us to read.

# THE MAGIC OF MOLECULES



**Dr. Anamika Khaskel**  
Associate Professor, Chemistry

Molecules are the tiny architects of our world, quietly shaping everything we see, touch, and experience. This year, as we explored the world of chemistry, students discovered how these invisible structures hold remarkable powers. From the air we breathe to the food we eat, molecules connect us to a universe of fascinating interactions. Understanding them allowed us to appreciate how beautifully science explains the world around us.

In the classroom, students learned how molecules form, bond, and react to create new substances. Each lesson revealed a new layer of complexity—showing how a simple arrangement of atoms can produce materials with entirely different properties. Concepts like covalent bonds, ionic interactions, and molecular geometry helped students visualize a world that normally remains unseen. What once felt abstract slowly became meaningful through experiments and models.

One of the most exciting aspects of this journey was watching students witness chemical reactions firsthand. Whether it was a change in color, the release of heat, or the formation of a new substance, each reaction demonstrated the magic that occurs when molecules rearrange themselves. These moments turned ordinary lessons into memorable experiences, reminding students that chemistry is full of surprises and discoveries.

As students progressed, they realized that molecules are not just scientific terms—they are the basis of life itself. Every heartbeat, every breath, every thought is powered by countless molecular processes happening within our bodies. This understanding helped them see chemistry not just as a subject, but as a story of life, energy, and transformation. Appreciating this connection sparked curiosity and a deeper respect for the natural world.

As we close the year, we celebrate the knowledge gained and the wonder that chemistry brings. The magic of molecules lies in their ability to transform, combine, and create the world we live in. Through this journey, students have learned to observe more carefully, think more scientifically, and appreciate the beauty hidden in everyday things. With this foundation, they are ready to explore even more mysteries of science in the years ahead.



# LEARNING TO LEAD : THE SKILLS THAT SHAPE THE FUTURE



Mr. Manish Jangir  
Lab Technician, Physics

Leadership is not defined by titles or positions—it begins with the willingness to take responsibility and inspire others. This year, our students discovered that learning to lead is a gradual process shaped by experiences, challenges, and everyday choices. Through group activities, classroom interactions, and new responsibilities, they began to understand what true leadership looks like in action.

One of the first lessons they learned was that leadership starts with self-discipline. Managing time, staying consistent with work, and showing a positive attitude set the foundation for influencing others. Students realized that before leading a group, they must learn to lead themselves. This development of self-control and accountability strengthened their character and prepared them for greater roles.

Teamwork played a powerful role in their growth. Working with classmates taught them the value of listening, cooperating, and respecting different perspectives. They discovered that a good leader does not command; instead, they encourage and guide. Through collaborative tasks and problem-solving exercises, students learned how to bring people together and create an environment where everyone feels valued.

Another essential part of leadership is communication. As students interacted in discussions, presentations, and group projects, they learned how important it is to express ideas clearly and confidently. They also discovered the equally important skill of understanding others—because great communication happens not only when we speak, but also when we listen. This balance helped them build trust and strengthen relationships.

As the academic year comes to a close, it is clear that the skills our students developed will shape their future in meaningful ways. Leadership is not a destination but an ongoing journey of growth, empathy, and courage. By learning to lead, they have prepared themselves to face challenges with confidence, support others with kindness, and contribute positively to the world ahead. These skills will continue to guide them, no matter where life takes them next.

# THE WORLD OF REACTIONS



**Mr. Kamal Kishore Kumawat**  
**Lab Assistant, Chemistry**

Chemical reactions surround us in everyday life, quietly shaping the world we live in. From the rusting of metals to the digestion of food, reactions transform substances and create new materials. This year, students explored how these processes occur, learning that reactions are not just abstract concepts but fundamental events that drive nature and industry alike.

In the classroom, students studied different types of reactions, such as oxidation, reduction, neutralization, and decomposition. Experiments helped them visualize these processes, showing how factors like temperature, concentration, and catalysts affect the speed and outcome of reactions. Observing these transformations firsthand made chemistry tangible and exciting.

An important part of learning was understanding the patterns reactions follow. By predicting products, balancing equations, and analyzing results, students developed critical thinking and problem-solving skills. Each successful prediction and observation boosted their confidence and reinforced the importance of logical reasoning in scientific study.

Beyond the lab, students discovered that reactions are part of daily life. Cooking, cleaning, breathing, and even the use of medicines involve chemical changes. Recognizing this connection helped them appreciate chemistry as a practical science that influences health, technology, and the environment in countless ways.

As the year concludes, the exploration of reactions has strengthened students' curiosity, observation skills, and scientific understanding. They have learned not only how substances change but also why these changes matter. This journey through the world of reactions has laid a strong foundation for future studies and inspired a lasting appreciation for the dynamic world of chemistry.





### THE AGE OF INTELLIGENT MACHINES: ROBOTS, ALGORITHMS, AND THE FUTURE OF WORK



"The future belongs to those who learn more skills and combine them in creative ways." – Robert Greene

Have you ever stopped to think about how much Artificial Intelligence (AI) and Robotics have changed our world, and how much more they will? It feels like science fiction, but intelligent machines are no longer just in movies; they're in our homes, our cars, and even helping doctors.

AI is basically about computers learning to "think" and solve problems just like we do. From recommending your next favorite song to helping self-driving cars navigate busy streets, machine learning algorithms are behind it all. These complex programs allow machines to analyze huge amounts of data, find patterns, and even make predictions.

Then there are robots! They're not just assembly line workers anymore. Imagine tiny surgical robots performing delicate operations, or powerful Mars rovers exploring other planets, sending back incredible discoveries. These machines are becoming incredibly smart, learning from their experiences and adapting to new situations.

Of course, this rapid change brings up big questions. What about our jobs? Will robots take over everything? It's a valid concern, and something experts are thinking about. It's clear that the future of work will change, requiring us to learn new skills and adapt alongside our intelligent machine friends. The key is to understand these technologies, learn how to work with them, and perhaps even create the next generation of intelligent machines ourselves! The age of intelligent machines isn't just coming; it's here, and it's exciting to be a part of it.

Punit Kumar  
B.TECH [CSE] 1<sup>st</sup> Year  
12025002001016



## BEYOND EARTH: THE NEW SPACE RACE FOR MOON COLONIZATION

"The Earth is the cradle of humanity, but mankind cannot stay in the cradle forever." – Konstantin Tsiolkovsky

"Fifty years ago, we planted a flag on the Moon and then left. Now, we are seriously planning to go back, not just for a quick visit, but to stay. This is the goal of the new space race, led by initiatives like NASA's Artemis program and many commercial partners. The long-term objective is huge: building a permanent, sustainable base on the Moon as the next major step for humanity.



But why the Moon, and why now? First, the Moon is a perfect testing ground for the ultimate goal: a mission to Mars. If we can learn to live and work on the Moon, we can apply those lessons to the Red Planet. More importantly, the Moon holds crucial resources. Scientists have confirmed the presence of water ice in permanently shadowed craters near the lunar poles. This water is a priceless resource; it can be melted for drinking, broken down into breathable oxygen, and even split into hydrogen and oxygen to create rocket fuel. This means a lunar base could eventually refuel rockets heading deeper into space!

Building a lunar city comes with extreme challenges. We must design shelters that protect against harsh radiation (since the Moon has no thick atmosphere) and extreme temperature swings. Engineers are exploring innovative methods like using regolith (Moon dust) to 3D-print structures directly on the lunar surface. We also need reliable power systems and ways to grow food.

The new space race is about more than just technology; it's about expansion. It's about securing a long-term future for our species and creating an off-world economy. The success of programs like Artemis will determine whether we become a truly multi-planetary species in our lifetimes.

Harsh Raj

B.TECH [CSE] 1<sup>st</sup> Year

12025002001015





## COLD FUSION: THE QUEST FOR INFINITE, CLEAN ENERGY

"The energy contained in matter is greater than anything we have yet harnessed." – Adapted from Albert Einstein

Imagine a world powered by the same reaction that lights up the Sun—clean, safe, and virtually limitless energy. That's the promise of nuclear fusion. Unlike nuclear fission, which generates power by splitting heavy atoms (and creates long-lived radioactive waste), fusion involves combining light atomic nuclei, typically deuterium and tritium (forms of hydrogen), to create a heavier element, helium. This process releases massive amounts of energy without producing harmful, long-term waste.

The challenge is incredible: how do you bottle the Sun? To get atoms to fuse, they must be heated to temperatures exceeding 150 million degrees Celsius, which is ten times hotter than the Sun's core! At these temperatures, matter turns into a superheated gas called plasma. This plasma must be contained and controlled.



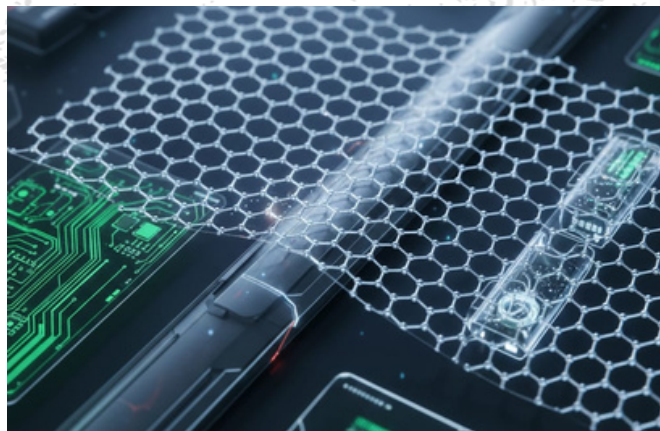
Scientists use massive machines called Tokamaks (doughnut-shaped reactors) that employ extremely powerful magnetic fields to keep the scorching plasma away from the reactor walls. Major global projects, like the ITER (International Thermonuclear Experimental Reactor) in France, are working to prove that fusion can produce more energy than it consumes—a vital milestone.

Success in cold fusion would solve the world's energy crisis overnight, providing humanity with a clean energy source that uses readily available materials (deuterium can be extracted from seawater). It's one of the greatest scientific quests of our time, pushing the boundaries of physics and engineering.

Tanuja Kumawat  
B.TECH [CSE] 1<sup>st</sup> Year  
12025002026006



## THE MAGIC OF GRAPHENE: THE WORLD'S STRONGEST, THINNEST MATERIAL



"The real magic of materials science is not in inventing new elements, but in arranging existing ones in new ways." – Inspired by the Nobel Prize research on Graphene

If you took a pencil lead and peeled off a single layer of its atoms, you would have Graphene. This material, which won a Nobel Prize in Physics in 2010, is only one atomic layer thick—making it a two-dimensional material. And yet, it's a true scientific superhero.

Graphene's properties sound like something from a comic book:

- It is 200 times stronger than steel by weight.
- It is incredibly light and flexible.
- It is the best conductor of heat and electricity ever discovered.

This perfect arrangement of carbon atoms in a hexagonal (honeycomb) lattice gives it incredible power. Scientists are now exploring how to use Graphene to revolutionize almost every aspect of technology.

Imagine electronic screens that you can fold like paper, or batteries that charge your phone in seconds and last for weeks. Graphene-enhanced batteries are already showing amazing potential for energy storage. Beyond electronics, it could be used in tiny, fast-acting sensors for medical diagnosis, or in ultra-efficient filters to purify seawater, thanks to its one-atom-thick structure. From faster computing to cleaner water, Graphene is poised to be the material that defines the 21st century.

Punit Kumar  
B.TECH [CSE] 1<sup>st</sup> Year  
12025002001016





## THE INVISIBLE ENEMY: UNDERSTANDING THE THREAT OF MICROPLASTICS

"We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect." – Aldo Leopold

We are facing an enemy that is all around us, yet often too small to see: microplastics. These are tiny fragments of plastic, smaller than 5\text{ mm}, that result from the breakdown of our everyday plastic items—everything from water bottles and synthetic clothes to old tires.



This is a global problem because microplastics travel everywhere. They are in our oceans, swallowed by marine life, and even found in the deepest trenches. They are in our soil, contaminating the food we grow. Recent studies have shockingly found them in the air we breathe and even inside the human body.

There are two main types: primary microplastics (like the microbeads once used in cosmetics) and secondary microplastics, which come from larger plastic items fragmenting over years. The danger isn't just that they are unsightly pollution; they can also absorb harmful chemicals from the environment. When fish, birds, or other animals consume these particles, those toxins enter the food chain, eventually making their way to us.

The good news is that solutions are being developed, from advanced filtration technologies to creating new, fully biodegradable materials. But the most effective step starts with us: reducing our use of single-use plastics and ensuring proper recycling. Tackling microplastics requires a conscious shift in how we treat the materials we use every single day.

Rakesh Bangra  
B.TECH [CSE] 3<sup>rd</sup> Year  
12023002001100



# ABOUT UEM JAIPUR

UEM Jaipur was established in the year 2011 by Ordinance 11 of 2011 and Act No 5 of 2012 of Govt of Rajasthan. UEM Jaipur has achieved the awards of "Best Private University in North India" and "Best Emerging University in North India".

UEM Jaipur has been established by the IEM group, Kolkata. The IEM UEM group is an acclaimed educational group amongst the industry-centred academic training organisations of today. IEM has set sublime standards in addressing the technical and managerial resource shortage in the new era of dynamic globalisation. The IEM UEM group has risen to fame for its strong foundation in teaching and R&D in multifaceted areas. It aims to serve the future generation as well as the Nation through its commitment towards self-sufficiency and unmatched excellence.

Since its inception, the IEM UEM group has surpassed innumerable benchmarks of achievements and accreditations. Today IEM flaunts a colossal network of expansive operations led by an awe-inspiring student force who are the torchbearers of a better tomorrow.

The IEM UEM Group has opened up the doors for young minds who dare to dream. It encourages the spirit of free enquiry and imagination. In this temple of learning dreams take shape. The educational group attempts to inculcate the sense of human values and discipline students to make them respectable human beings. It encourages learners to learn, to realize their potential and imbibes the best practices.







**About Us** The Department of basic sciences at UEM Jaipur stands as a center of innovation, learning, and academic excellence. We are committed to empowering students with the foundational skills and knowledge required to excel in the rapidly evolving technological landscape. Through advanced research, experiential learning, and strong industry partnerships, we nurture curiosity, creativity, and a problem-solving mindset. Together, we are shaping the future of technology and its profound influence on society.

#### **About the Magazine**

“The Infinity” is the official magazine of the Department of basic sciences at UEM Jaipur, dedicated to celebrating innovation, creativity, and academic excellence. Its second edition, “The Infinity”, serves as a dynamic platform to highlight the achievements, ideas, and aspirations of our students, faculty, and collaborators. Featuring thought-provoking articles and groundbreaking projects, the magazine embodies the spirit of curiosity and the relentless pursuit of knowledge that defines our department.