K. RAMAKRISHNAN COLLEGE OF ENGINEERING

(Autonomous) | Approved by AICTE | Affiliated to Anna University, Chennai
Accredited by NAAC with "A' Grade | NBA Accredited Departments

DEPARTMENT OF

MECHANICAL ENGINEERING

KRCExpress

PERSISTENCE TOWARDS PASSION

Vol. II Issue 4 | Magazine 2022-23

QUALITY EDUCATION

RESEARCH & INNOVATION

INDUSTRY COLLABORATION

STUDENT EXCELLENCE

Together We Engineer The Future

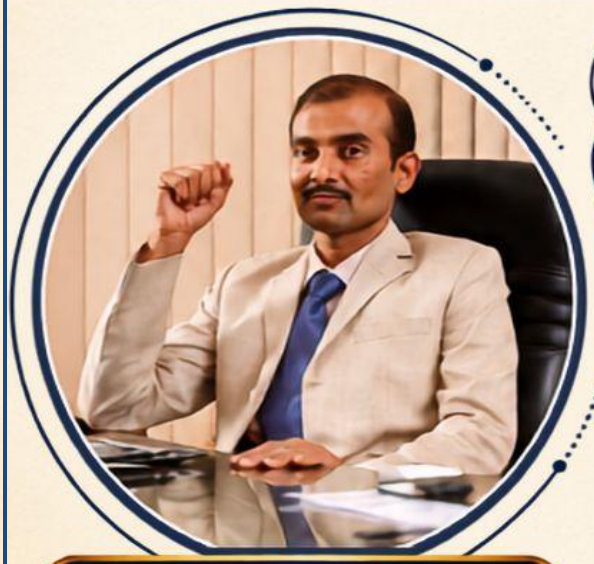
LEADERSHIP MESSAGES

CHAIRMAN MESSAGE

The Department of Mechanical Engineering at K Ramakrishnan College of Engineering is dedicated to shaping innovative and skilled engineers through quality education, practical exposure, and research excellence. The department strives to empower students with technical knowledge, professional ethics, and leadership skills to meet global industrial challenges and contribute effectively to society.

DR. K. RAMAKRISHNAN
CHAIRMAN – KR Group

EXECUTIVE DIRECTOR'S MESSAGE



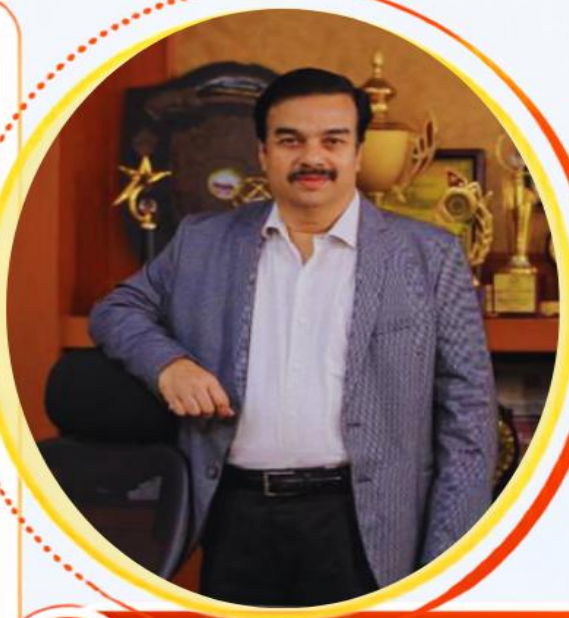
The Department of Mechanical Engineering at K. Ramakrishnan College of Engineering is committed to academic excellence, innovation, and industry-oriented learning. With advanced laboratories, experienced faculty, and a strong research culture, the department prepares students to become competent mechanical engineers with technical expertise, ethical values, and leadership skills to excel in their careers and serve society.

DR. S. KUPPUSAMY
EXECUTIVE DIRECTOR – KR GROUP

LEADERSHIP MESSAGES

PRINCIPAL'S MESSAGE

The Department of Mechanical Engineering at K. Ramakrishnan College of Engineering plays a vital role in shaping technically proficient and innovative engineers. The department focuses on delivering quality education through modern laboratories, experienced faculty, and research-driven learning. It strives to equip students with technical knowledge, practical skills, and ethical values to meet industrial challenges and emerge as successful professionals who contribute meaningfully to society.



DR. D. SRINIVASAN
PRINCIPAL - KRCE

DR. H. RAMAKRISHNAN
HOD / MECHANICAL

HOD'S MESSAGE

Welcome to the Department of Mechanical Engineering. Our mission is to bridge the gap between academic excellence and industrial requirement. Through our state-of-the-art laboratories and robust industry partnerships, we ensure our students gain the technical proficiency and practical experience necessary for a successful career. We take pride in our commitment to developing disciplined, competent, and ethical professionals who contribute meaningfully to the engineering community and society at large.

QUALITY EDUCATION | RESEARCH & INNOVATION | INDUSTRY COLLABORATION | STUDENT EXCELLENCE

DEPARTMENT OF MECHANICAL
KRC Express
Persistence towards Passion
K. RAMAKRISHNAN COLLEGE OF ENGINEERING

Vol. II Issue 4 KRCExpress 2022-23

EDITORIAL BOARD

A magazine is a reflection of the department's achievements, innovations, and aspirations. Through this publication, we celebrate academic excellence, research contributions, student accomplishments, and the collective efforts of our Mechanical Engineering family.

DEPARTMENT OF MECHANICAL ENGINEERING

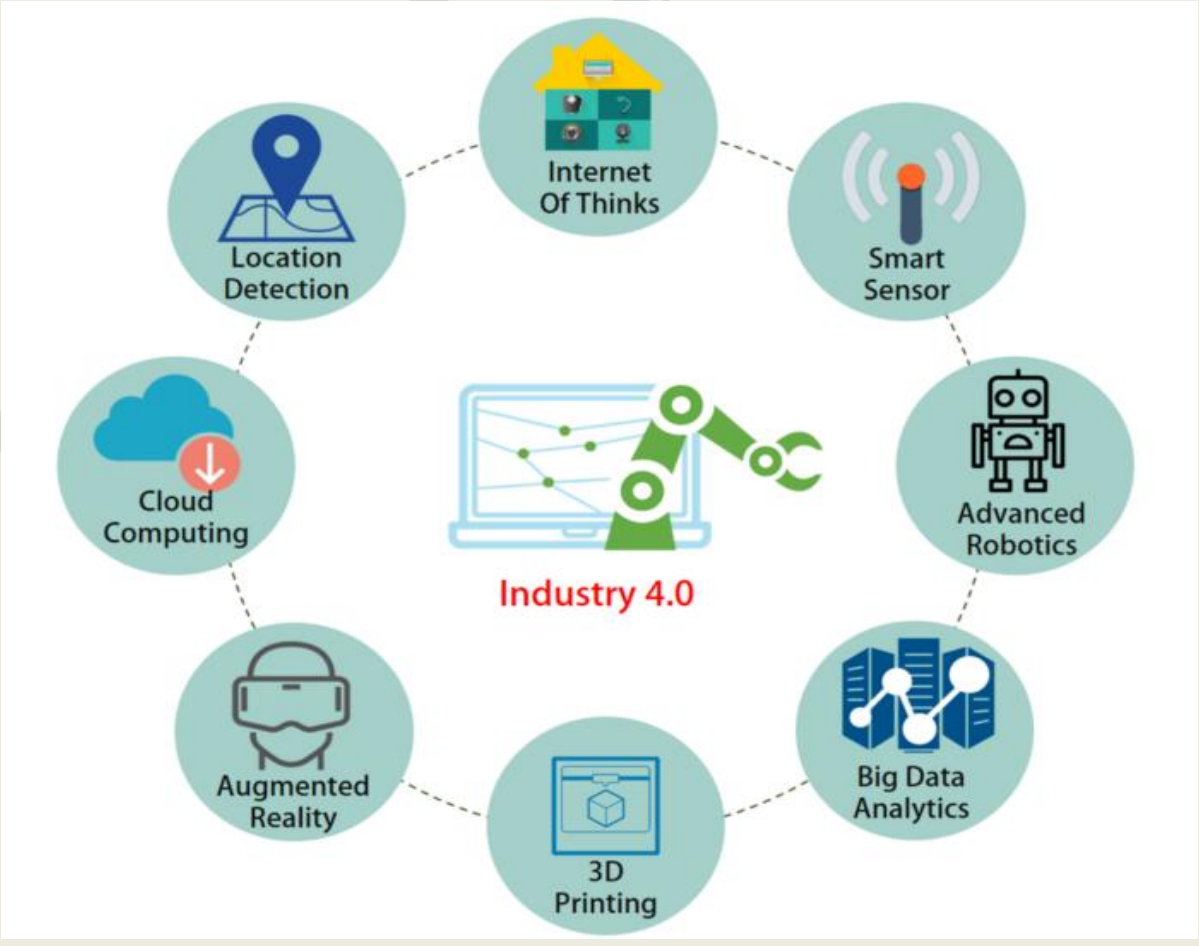
KRCExpress – Persistence Towards Passion

TECHNICAL REPORT

INDUSTRY 4.0 – DIGITAL TECHNOLOGIES FOR SMART MANUFACTURING

Industry 4.0 represents the fourth industrial revolution, where advanced digital technologies transform conventional manufacturing into intelligent, automated, and connected production systems. It integrates physical machines with digital technologies to improve productivity, quality, efficiency, and decision-making. The framework consists of several key technologies that enable smart factories and sustainable industrial growth.

The Internet of Things (IoT) connects machines, sensors, and devices through the internet, allowing real-time communication and monitoring of manufacturing processes. Smart Sensors continuously collect data on machine performance, temperature, pressure, and vibration, enabling accurate process control and predictive maintenance. Advanced Robotics enhances manufacturing through automated material handling, assembly, welding, and inspection, increasing precision while reducing human effort and production time.



Big Data Analytics processes large volumes of industrial data to identify patterns, optimize production, improve product quality, and support data-driven decision-making. 3D Printing (Additive Manufacturing) enables rapid prototyping and customized product development while reducing material waste and manufacturing costs. Augmented Reality (AR) assists engineers and technicians in maintenance, training, and product visualization by overlaying digital information onto real-world environments.

Cloud Computing provides secure storage, real-time data sharing, and remote access to manufacturing information, improving collaboration and operational flexibility. Location Detection Technologies, such as RFID and GPS, enable real-time tracking of materials, equipment, and products throughout the supply chain, enhancing inventory management and logistics efficiency.

The integration of these technologies creates Smart Factories capable of autonomous operation, predictive maintenance, real-time monitoring, and efficient resource utilization. For engineering students, understanding Industry 4.0 provides valuable technical knowledge in automation, digital manufacturing, artificial intelligence, and smart production systems. These emerging technologies prepare future engineers to meet the demands of modern industries and contribute to innovation, sustainable manufacturing, and global industrial competitiveness.

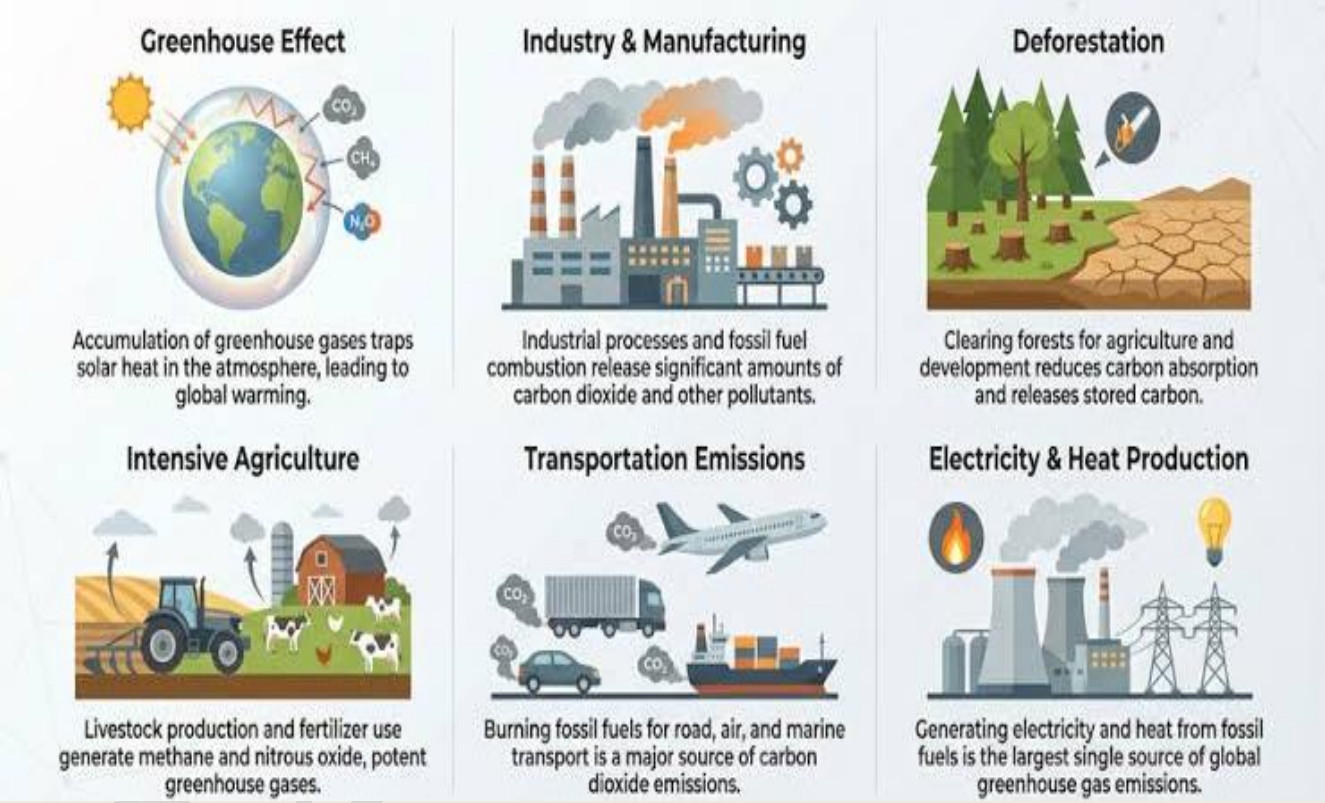
MUGUNDHAN M

III YEAR / MECHANICAL

CAUSES OF CLIMATE CHANGE

Climate change is one of the most significant global environmental challenges, primarily caused by human activities that increase the concentration of greenhouse gases (GHGs) such as carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) in the atmosphere. These gases trap heat through the greenhouse effect, leading to global warming, rising sea levels, extreme weather events, and ecosystem degradation.

The major contributor to climate change is electricity and heat production, where fossil fuels such as coal, oil, and natural gas are burned to generate power, releasing large amounts of CO_2 into the atmosphere. Industrial and manufacturing activities also emit greenhouse gases through fuel combustion, cement production, and chemical processing. The adoption of cleaner production technologies and renewable energy can significantly reduce industrial emissions.



Transportation is another major source of greenhouse gas emissions due to the widespread use of petrol and diesel vehicles, aircraft, and ships. Promoting electric vehicles, public transportation, and alternative fuels can help reduce carbon emissions. Deforestation accelerates climate change by reducing the Earth's capacity to absorb carbon dioxide while releasing stored carbon during land clearing for agriculture and urban development.

Intensive agriculture contributes to climate change through methane emissions from livestock and nitrous oxide released from fertilizers. Sustainable farming practices, precision agriculture, and efficient fertilizer management can minimize these emissions while improving agricultural productivity.

Engineering solutions play a vital role in mitigating climate change through the development of renewable energy systems, energy-efficient technologies, carbon capture methods, electric mobility, green buildings, and sustainable manufacturing practices. For engineering students, understanding the causes of climate change is essential for designing innovative technologies that reduce environmental impacts and promote sustainable development. By applying scientific knowledge and engineering principles, future engineers can contribute to building a cleaner, greener, and more climate-resilient world.

SIVA PRASANNA B

II YEAR / MECHANICAL

AR/VR DEMONSTRATION

This project presents the design and development of an integrated Augmented Reality (AR) and Virtual Reality (VR) system to enhance user interaction and immersive experiences by seamlessly combining real-world visualization with virtual environment simulation. The AR module utilizes a markerless plane detection technique, enabling users to place a realistic 3D dragon model on real-world surfaces without the need for image tracking. The system incorporates an intuitive dual joystick control mechanism,

allowing users to move the virtual object in multiple directions and perform complete 360-degree rotation, thereby improving flexibility, interaction, and user engagement. The VR module is designed as an endless runner environment, where players navigate through obstacles using real-time controls while being pursued by an AI-driven dragon capable of dynamically tracking and responding to player movements.

Upon collision or game termination, the dragon intelligently transitions to a passive state by approaching and positioning itself near the player, creating a more realistic and emotionally engaging virtual experience. By integrating AR and VR technologies into a unified platform, the project successfully enhances visualization, interactivity, and immersion while demonstrating the practical applications of Artificial Intelligence, Human-Computer Interaction, 3D Modelling, and Immersive Computing. The developed system has significant potential for applications in gaming, engineering education,

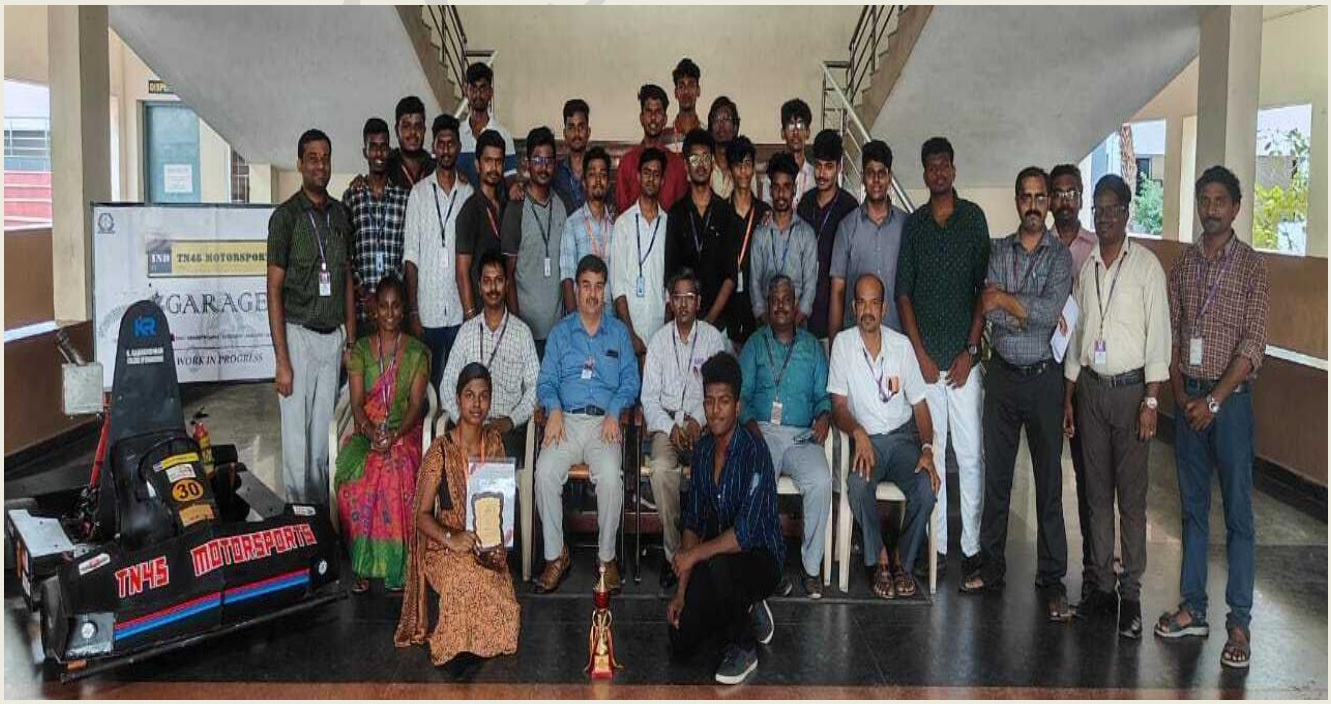
industrial training, healthcare, architecture, and simulation-based learning, providing students with valuable technical knowledge and hands-on experience in emerging digital technologies aligned with Industry 4.0 and the Metaverse.

GO-KART DESIGN CHALLENGE (GKDC) 2023

The Department of Mechanical Engineering, K. Ramakrishnan College of Engineering, proudly celebrates the remarkable achievement of its student team in the Go-Kart Design Challenge (GKDC) 2023, a prestigious national-level engineering competition that provides students with a platform to demonstrate their technical knowledge, innovation, and practical engineering skills.

The team successfully designed, fabricated, assembled, and presented a high-performance go-kart that showcased excellence in engineering design, manufacturing practices, safety standards, and aesthetic appeal. Their commitment to quality, creativity, and teamwork enabled them to compete successfully among leading engineering institutions from across the country.

The student team was led by Team Captain Mr. U. Kishore and Vice Captain Mr. P. Ragul, whose effective leadership, coordination, and dedication played a significant role in the successful planning and execution of the project. The team worked under the expert guidance of Dr. H. Ramakrishnan, Head of the Department of Mechanical Engineering, whose constant encouragement and visionary leadership inspired the students throughout the project. The technical mentoring provided by Mr. S. Raghuvaran and Mr. M. Manimaran, Assistant Professors, Department of Mechanical Engineering, was instrumental in supporting the students during the design, analysis, fabrication, testing, and validation phases of the go-kart development.



The team's outstanding efforts were recognized with the prestigious "Best Aesthetics Award", which honored their exceptional achievement in vehicle styling, innovative body design, visual presentation, creativity, craftsmanship, and overall aesthetic excellence while maintaining engineering functionality and performance standards. This recognition reflected the students' ability to combine engineering principles with creativity, resulting in a visually appealing and technically sound racing vehicle.

Following this remarkable accomplishment, the student team was felicitated by Dr. D. Srinivasan, Principal, K. Ramakrishnan College of Engineering, in the presence of faculty members and fellow students. He appreciated the team's dedication, perseverance, innovation, and collaborative spirit, and commended the guidance provided by the faculty mentors and the Head of the Department. He encouraged students to actively participate in national-level technical competitions to strengthen their practical knowledge, research aptitude, and professional competencies.

MR. TALENTIA 2023

The Department of Mechanical Engineering, K. Ramakrishnan College of Engineering, proudly celebrates the outstanding achievement of Mr. M. Sridhar, III Year Mechanical Engineering, for winning the prestigious Overall Mr. Talentia 2023 title. This remarkable accomplishment reflects his exceptional talent, creativity, confidence, and dedication across a wide range of cultural and extracurricular events. His consistent performance, versatility, and stage presence enabled him to emerge as the overall champion, bringing immense pride and recognition to the Department of Mechanical Engineering and the institution.

Throughout the academic year, Mr. M. Sridhar actively contributed to various college cultural events, showcasing his multifaceted abilities in performing arts, stage performances, literary and entertainment activities, and interdepartmental competitions. His enthusiastic participation and outstanding performances inspired fellow students to actively engage in extracurricular activities while maintaining a balance between academic excellence and personal development. His leadership, confidence, and team spirit played a significant role in the successful execution of several cultural programmes organized by the institution.

The Mr. Talentia 2023 competition served as a platform to identify and recognize students with exceptional all-round talent, evaluating participants on creativity, communication skills, personality, stage confidence, cultural performance, and overall presentation. Through his remarkable dedication, hard work, and perseverance, Mr. M. Sridhar excelled in every stage of the competition and earned the coveted Overall Mr. Talentia 2023 title.

The Department of Mechanical Engineering applauds his outstanding contribution to promoting a vibrant cultural environment within the campus. His achievement reflects the institution's commitment to nurturing holistic student development by encouraging participation in academics, sports, technical activities, and cultural events. The department extends its heartfelt congratulations to Mr. M. Sridhar for bringing laurels to the institution and wishes him continued success in all his future endeavors.

SPORTS ACHIEVEMENTS

The Department of Mechanical Engineering proudly extends its heartfelt congratulations to Mr. S. K. Vasantha Kumar, III Year, for securing First Place in the State Level Deadlift Competition held in February 2023. His remarkable strength, determination, and unwavering dedication have earned him this prestigious achievement, bringing immense pride and recognition to the department and K. Ramakrishnan College of Engineering. His commitment to rigorous training, discipline, and perseverance exemplifies the true spirit of sportsmanship and excellence. This outstanding accomplishment reflects the institution's encouragement of holistic student development through active participation in sports and fitness activities. The department appreciates his exceptional performance and wishes him continued success in future state, national, and international competitions.

Heartiest congratulations, and may you continue to achieve greater milestones in your sporting journey!

The Department of Mechanical Engineering proudly extends its heartfelt congratulations to Mr. Jeeva for securing the Third Place (Runner-Up) in the Anna University Zonal Level Tennis Tournament held in November 2023. His outstanding performance, determination, and exceptional sporting spirit have brought immense pride and recognition to the department and K. Ramakrishnan College of Engineering. Through his dedication, discipline, and perseverance, he demonstrated remarkable skill and competitiveness throughout the tournament. This achievement reflects the institution's commitment to encouraging excellence in sports alongside academic pursuits. The department applauds his remarkable accomplishment and wishes him continued success in future intercollegiate, state, and national-level tennis competitions. Heartiest congratulations, and may you continue to achieve greater milestones in your sporting journey!

FAREWELL FUNCTION – BATCH 2019–2023

The Department of Mechanical Engineering, K. Ramakrishnan College of Engineering, organized a heartfelt Farewell Function to bid a warm and memorable farewell to the outgoing Batch of 2019–2023. The event was a joyous occasion that celebrated the academic journey, achievements, friendships, and unforgettable memories shared by the graduating students during their four years at the institution. Faculty members, staff, juniors, and well-wishers came together to honor the final-year students and wish them success in their future endeavors.

The programme featured inspiring addresses by the Head of the Department, faculty members, and student representatives, who reflected on the students' remarkable journey and encouraged them to embrace future challenges with confidence and determination.

Students shared their memorable experiences, expressed their gratitude to the faculty for their continuous guidance and support, and reminisced about the friendships, learning experiences, and campus life that made their college years truly special. Various cultural performances, fun-filled activities, and interactive sessions added excitement to the celebration, creating an atmosphere of joy, appreciation, and nostalgia.

The farewell function also served as an opportunity to recognize the valuable contributions of the 2019–2023 batch in academics, technical events, project exhibitions, sports, cultural activities, and departmental initiatives. Their active participation and dedication significantly enhanced the reputation of the Department of Mechanical Engineering. The programme concluded with the presentation of mementos, the exchange of heartfelt wishes, and a group photograph, symbolizing the strong bond between the students and the department. The Department extended its sincere best wishes to the graduating students for a bright, successful, and fulfilling future, expressing confidence that they would continue to uphold the values and legacy of K. Ramakrishnan College of Engineering wherever their professional journey takes them.