

# MEXPRESS

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Mechanical Engineering Department's Official Newsletter  
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Mechanical Engineering Association  
Department of Mechanical Engineering  
KUMARAGURU COLLEGE OF TECHNOLOGY



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## From the Editors...

Dear Readers,

Greetings!

Welcome to another edition of our departmental newsletter, where we bring you the latest updates and highlights from the vibrant academic landscape within our esteemed department. As we navigate through last month, our commitment to excellence and innovation in education remains unwavering.

In the past month, our department has successfully organized a series of enriching programs, fostering an environment of collaborative learning and professional development. These events aim to provide our students with a holistic educational experience, bridging the gap between theory and practical application.

Our esteemed faculty members continue to play a pivotal role in shaping the academic discourse. Their contributions as resource persons in various seminars and workshops have added immense value to our academic community, bringing in-depth insights and perspectives.

The intellectual prowess of our faculty was showcased through their engaging paper presentations at national and international conferences. These presentations not only reflect the depth of knowledge within our department but also contribute significantly to the academic discourse in our field.

We take pride in acknowledging the research achievements of our faculty members, with several papers published in reputable journals. These publications underscore our commitment to advancing knowledge and contributing to the scholarly community.

Our faculty members have actively engaged in the peer review process, demonstrating their dedication to maintaining high academic standards. The thorough review of manuscripts ensures the quality and credibility of the research output associated with our institution.

Celebrating academic milestones, we recently witnessed the successful completion of Ph.D. viva voce examinations. We congratulate the scholar for her perseverance and the faculty mentor for his guidance and support throughout the research journey.

Our department continues to strengthen its ties with the industry, creating avenues for collaborative projects, internships, and real-world applications of academic knowledge. Such linkages bridge the gap between academia and industry, providing our students with valuable insights and opportunities. Participation in national and international programs remains an integral part of our academic calendar. These events not only expose our students and faculty to diverse perspectives but also foster a culture of continuous learning and adaptability.

Take a glimpse into the vibrant life of our department through our "Snap Shots" section, capturing moments of camaraderie, collaboration, and academic exploration.

## Editors' Portfolio

Our dynamic students showcased their research acumen through impressive paper presentations. It's heartening to witness the intellectual growth and enthusiasm displayed by our future professionals. Beyond the classroom, our students actively participated in extracurricular and co-curricular activities, showcasing their talents and holistic development.

We take immense pride in acknowledging the achievements of our students, be it in academics, sports, or cultural activities. Your success is a testament to your hard work and dedication.

In our "Student Articles" section, we feature thought-provoking piece written by one of our students. This platform encourages them to express their opinions, share insights, and contribute to the intellectual dialogue within our community.

In conclusion, I extend my gratitude to the entire academic community for their relentless pursuit of knowledge and dedication to our department's growth. Let us continue to strive for excellence, innovation, and collaboration in the upcoming months.

Best regards,

**Editors....**



## PROGRAMMES ORGANIZED



A Parent Teachers Meeting (PTM) was organized by the department on 02-12-2023. **Dr. S. Ramanathan**, Assistant Professor – III, coordinated the meeting.



A guest lecture on “Unleash your latent talent for success” was organized by the department on 19-12-2023. **Mr. Ganesan**, Trainer - Soft skills, Spoken English & IELTS Motivational speaker was the resource person. **Dr. V. Manivel Muralidaran**, Assistant Professor – III, coordinated the guest lecture.



## FACULTY AS RESOURCE PERSONS:



**Dr. V. Manivel Muralidaran**, Assistant Professor – III, acted as external examiner for the End Semester PG Practical Examination at SNS College of Technology, Coimbatore on 05-12-2023.

**Mr. P. Pradeep**, Assistant Professor – II, acted as University Representative for the End Semester Theory Examination at Dr. NGP Institute of Technology, Coimbatore on 05-12-2023.



**Mr. S. Prabhu**, Assistant Professor – II, acted as External Examiner for the End Semester Practical Examination at SNS College of Engineering, Coimbatore on 06-12-2023.

**Dr. S. Rajesh**, Assistant Professor – III, acted as External Examiner and Appointed as Vigilance Squad for Theory Examinations at Hindusthan Institute of Technology, Coimbatore on 07-12-2023. He acted as External Examiner for the End Semester Paper Valuation at Hindusthan Institute of Technology, Coimbatore on 16-12-2023. Also, he acted as External Examiner for the End Semester Paper Valuation at Hindusthan Institute of Technology, Coimbatore on 21-12-2023.



**Mr. S. Prabhu**, Assistant Professor – II, acted as External Examiner for the End Semester Practical Examination at Sri Ramakrishna Engineering College, Coimbatore on 08-12-2023 and 09-12-2023.

**Mr. V. R. Navaneeth**, Assistant Professor – II, acted as External Examiner for the End Semester Practical Examination at Sri Ramakrishna Engineering College on 08-12-2023 and 09-12-2023.



**Dr. V. R. Muruganantham**, Associate Professor acted as External Examiner for the End Semester Practical Examination at Government College of Technology, Coimbatore on 08-12-2023.

**Dr. M. Balaji**, Associate Professor, acted as External Examiner for the End Semester Practical Examination at Government College of Technology, Coimbatore on 08-12-2023.



**Dr. P. S. Samuel Ratna Kumar**, Assistant Professor – III, acted as Resource Person and Session Chair in the International Conference of Innovation, Sustainability & Applied Sciences (ICISAS-2023) organized by Curtin University – Australian University at Dubai campus from 07-12-2023 to 10-12-2023. He also acted as Resource Person and Session Chair in the 11<sup>th</sup> National Conference on MEMS, Smart Materials, Structures, organized by KCT jointly with Institute of Smart Structures and Systems (ISSS) from 14-12-2023 to 16-12-2023.



**Dr. B. Senthilkumar**, Associate Professor, acted as External Examiner for the End Semester Practical Examination at Government College of Technology, Coimbatore on 11-12-2023 and 12-12-2023.



**Dr. K. K. Arun**, Assistant Professor – III and **Mr. S. Prabhu**, Assistant Professor acted as External Examiner for the End Semester Paper Valuation at Hindusthan Institute of Technology, Coimbatore on 11-12-2023.





## Department Activities



**Dr. K. K. Arun**, Assistant Professor – III, acted as External Examiner for the End Semester Practical Examination at Sri Ramakrishna Engineering College, Coimbatore on 07-12-2023 to 09-12-2023.



**Dr. M. Thirumalai Muthukumar**, Assistant Professor – III, acted as External Examiner for the End Semester Paper Valuation at KPR Institute of Engineering and Technology from 19-12-2023 to 20-12-2023.



**Dr. B. N. Sreeharan**, Assistant Professor – III, acted a Jury Member for the Edge Courses on "Statistics Using Excel" and "Tech for Good: Achieving the SDGs by the role of ICT Edge and Edge+ courses" at KCT, Coimbatore on 19-12-2023. Further, he acted as Resource Person and delivered lectures on "A Journey Towards Quality Research Publication" for the PG students of KCT, organized by PG



Forum of KCT on 29-11-2023, 06-12-2023, 13-12-2023, 20-12-2023 and on 27-12-2023.  
**Dr. V. R. Muruganatham**, Associate Professor, coordinated the event.



**Dr. S. Ramanathan**, Assistant Professor – III, and **Mr. K. Manikanda Prasath**, Assistant Professor – II, was invited for Pre-Bidding Meeting bidding for the Tug for 20 T Aircrafts, the technical requirements and clarifications were discussed in the meeting at Air Force Station Sulur on 29-12-2023.



## PAPER PRESENTATIONS:



**Dr. B. N. Sreeharan**, Assistant Professor – III, presented following two papers in the 2<sup>nd</sup> International Conference on Water, Energy & Environment [WEECON 2023] organized by ISET Research India in association with Maejo University Thailand & Saigon University Vietnam on 29-12-2023 and 30-12-2023.

"Enhancing solar panel efficiency Through wind-driven cooling: a computational study" and "A Novel Approach Towards a Sustainable Energy Storage: Vacuum Based Energy Storage"

## PAPER PUBLICATIONS:



**Dr. S. Thirumurugaveerakumar**, Associate Professor, published his paper titled "Enhancement in the Process of COCO Peat Drying", in the International Journal of Research and Analytical Reviews (IJRAR), Volume 10, Issue 4, E-ISSN 2348-1269, P- ISSN 2349-5138

## MANUSCRIPTS REVIEWED:

**Dr. P. S. Samuel Ratna Kumar**, Assistant Professor, reviewed the following manuscripts for SCI indexed International Journals: (1) A Novel approach of chemical and wear failure analysis, and modeling of Gr reinforced Al6061-TiB2 hybrid composites, Mining and Metallurgy International (2) Research on microstructure evolution and surface quality of WEDM for magnetic refrigerant rare - earth gadolinium for Surface Topography Metrology and Properties



**Dr. B. Senthilkumar**, Associate Professor, reviewed a manuscript titled "Research on the Simulation and Test for the Micro-Newton Electromagnetic Calibration Force Measurement" for the Measurement Journal, SCI indexed International Journal.

## Ph. D. STUDENT – VIVA VOCE:

**Mrs. C. Lavanpriya**, 1524269218, research Scholar of **Dr. V. Muthukumar**, Professor, pursuing her Doctoral Research at Anna University, Chennai was successfully defended her Ph. D. Viva Voce on 11-12-2023.



## INDUSTRY LINKAGE:



**Dr. M. Balaji**, Associate Professor, visited Solid and Liquid Resource Management Plant on 05-12-2023 located at, Panneermadai Village, Coimbatore.

## PROGRAMMES PARTICIPATED

**Dr. A. P. Arun**, Assistant Professor - III, participated in an FDP on "Advanced Modelling and Simulations for Engineers" from 18-12-2023 to 22-12-2023, organized by National Institute of Technology, Karaikal.



**Mr. K. Manikanda Prasath**, Assistant Professor - II, participated in an FDP on "Advanced Modelling and Simulations for Engineers" from 18-12-2023 to 22-12-2023, organized by National Institute of Technology, Karaikal.



**Dr. B. N. Sreeharan**, Assistant Professor - III, participated in a Training and got certified the Lean Six Sigma AI Yellow Belt" on 10-12-2023, conducted by Sparen & Gewinn Consulting. He also participated in a Workshop on "Recent Enhancement in Welding Technology" on 22-12-2023 organized by PSG College of Technology, Coimbatore. Further he and his team participated in International Inter Varsity Innovation Challenge 2023 and presented a couple of topics on "Novel Wave Energy Extracting Platform" and "Vacuum Energy Storage System" on 08-12-2023, organized by INTI International University, Malaysia and awarded with Gold and Bronze Medal respectively.

**Dr. K. Krishnamoorthi**, Assistant Professor - III, participated in an FDP on "Advanced Modelling and Simulations for Engineers" from 18-12-2023 to 22-12-2023, organized by National Institute of Technology, Karaikal.



**Mr. B. Jeeva**, Assistant Professor - II, participated in an FDP on "Entrepreneurship Development Programme" from 13-12-2023 to 26-12-2023, organized by PSG College of Arts and Science, Coimbatore.

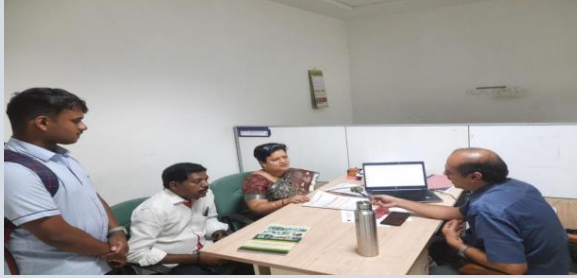


**Dr. P. S. Samuel Ratna Kumar**, Assistant Professor - III, participated in a Conference on "Sustainability & Applied Sciences (ICISAS-2023) " from 07-12-2023 to 10-12-2023, organized by Curtin University – Australian University. He also participated in a Conference on "COP28-UAE " from 07-12-2023 to 08-12-2023, organized by United Nations (UN) Climate Change.

**Mr. R. S. Mohankumar**, Assistant Professor - II, participated in an FDP on "Advanced Modelling and Simulations for Engineers" from 18-12-2023 to 22-12-2023, organized by National Institute of Technology, Karaikal.



## SNAPSHOTS



Parents Teaching Meeting



Guest lecture by **Mr. Ganesan**

## Department Activities



**Dr. P. S. Samuel Ratna Kumar** as Session Chair



**Dr. P. S. Samuel Ratna Kumar** at International Conference of Innovation, Sustainability & Applied Sciences (ICISAS-2023)

# Department Activities



Dr. P. S. Samuel Ratna Kumar at COP28-UAE organized by United Nations (UN) Climate Change





**Dr. B. N. Sreeharan** as Jury Member



**Dr. M. Balaji** at SLRM Plant, Coimbatore

## PAPER PRESENTATIONS:

**Mr. T. Suresh**, 23PME01R, participated in 11th National Conference on MEMS, Smart Materials, Structures on 15-12-2023 organized by KCT jointly Institute of Smart Structures and Systems (ISSS) and presented his paper titled "Investigation on Additive Manufactured AlSi10Mg Alloy as Anode Material for Aluminium Air Battery" guided by **Dr. P. S. Samuel Ratna Kumar**, Assistant Professor – III.

Following students participated in 2nd International Conference on Water, Energy & Environment [WEECON 2023] conducted by ISET Research India in association with Maejo University Thailand & Saigon University Vietnam on 29-12-2023 and presented their paper entitled "Enhancing solar panel efficiency Through wind-driven cooling: a computational study" under guidance of **Dr. B. N. Sreeharan**, Assistant Professor – III.

**Mr. P. Sudalaimuthu Suresh**, 20BME112

**Mr. K. S. Vigneshraja**, 22BME123

**Mr. P. Shrikanth**, 22BME099

**Mr. S. Kalanithi**, 22BME042

Following students participated in 2nd International Conference on Water, Energy & Environment [WEECON 2023] conducted by ISET Research India in association with Maejo University Thailand & Saigon University Vietnam on 29-12-2023 and presented their paper entitled "A Novel Approach Towards a Sustainable Energy Storage: Vacuum Based Energy Storage" under guidance of **Dr. B. N. Sreeharan**, Assistant Professor – III.

**Mr. P. Sudalaimuthu Suresh**, 20BME112

**Mr. T. N. Mithun**, 22BME059

## PARTICIPATIONS:

**Mr. M. Kesavdarshan**, 22BME048 participated in regional meet of Institutions Innovation Council, MoEs Innovation Cell on 04-12-2023 at Nehru Institute of Technology, Coimbatore.

**Mr. K. M. Sowbiraaj**, 22BME104, participated in Scholarship Program on 13-12-2023 and 14-12-2023 at Shanthi Social Services, Singanallur.

**Mr. T. Suresh**, 23PME01R, have taken up a training in Basic Metal 3D Printing from 06-12-2023 to 08-12-2023 organized by Neumesh Labs Private Limited, Bengaluru. He also completed an NPTEL course on "Metal Additive Manufacturing" from 17-07-2023 to 21-10-2023.

Following students Volunteered in organizing Kumaraguru Alumni Trophy 2023 on 23-12-2023.

**Mr. R. Sukesh**, 22BME255

**Mr. Hashwic V Vincent**, 21BME032

**Mr. Kamalesh Ganeshan**, 21BME038

**Mr. J. Harikaran**, 22BME034

## Student Activities

Following students have volunteered through KARE, KCT for relief of rain affected Southern 4 Districts (Tirunelveli, Tuticorin, Kanyakumari & Tenkasi) on 19-12-2023.

**Mr. B. Nitin**, 22BME069

**Mr. S. Smith**, 22BME103

**Mr. P. Kathir Lakshman**, 23BME044

**Mr. T. Subash**, 22BME107

### ACHIEVEMENTS:

**Mr. P. Sudalaimuthu Suresh**, 20BME112, participated under the guidance of **Dr. B. N. Sreeharan**, Assistant Professor – III, in International Inter Varsity Innovation Challenge 2023 and presented their work on “Novel Wave Energy Extracting Platform” on 08-12-2023, organized by INTI International University, Malaysia and awarded with **Gold Medal**.

**Mr. K. S. Vigneshraja**, 22BME123 and **Mr. S. Kalanithi**, 22BME042, participated under the guidance of **Dr. B. N. Sreeharan**, Assistant Professor – III, in International Inter Varsity Innovation Challenge 2023 and presented their work on “Vacuum Energy Storage System” on 08-12-2023, organized by INTI International University, Malaysia and awarded with **Bronze Medal**.

### Revolutionizing Flight: The Impact of Composites in Aerospace Engineering



Ms. P. Kirubashini  
II Mech. 'A'

In the ever-evolving field of aerospace engineering, the integration of composite materials has brought in a new era of innovation. The use of composites in various aerospace components has not only resulted in considerable weight reduction but has also made it is easy for the manufacturing of more complex structures, and has paved way for mind blowing advancements.

The emergence of robust materials like carbon fibre and advancements in polymer research has revolutionized aerospace construction, with advanced composites playing a crucial role in military and civil aircraft, helicopters, satellites, launch vehicles, and missiles globally. In India, national aerospace programs utilise composite materials in projects such as advanced fighters, light helicopters, all-composite passenger aircraft, remotely piloted vehicles, satellites, and launch vehicles. Composite materials in aerospace offer an edge in areas such as high specific strength, fatigue resistance, and capability for optimization. They enable the moulding of large, complex shapes with reduced assembly times and provide stability in space environments.

It has inherent limitations and challenges such as weak interfaces and susceptibility to impact damage, moisture absorption and consequent degradation of high temperature performance, requirement of new and complicated analysis tools. Despite all these, its benefits are numerous and hence it is used in this field.

Advances in aerospace composites involve continuous improvements in reinforcement materials, particularly carbon fibre technology targeting higher strength and modulus: one, for aircraft applications, is aimed basically at higher strength ( $> 5$  GPa) with concurrent improvements in modulus to a moderate level ( $> 300$  GPa) and the other, for space applications, is aimed at high modulus ( $> 500$  GPa) with moderate strength GPa). Matrix resin improvements focus on enhancing impact damage tolerance and hygrothermal degradation resistance. Recent areas of focus include improving toughness, increasing failure strain, and exploring newer systems like cynate esters and thermoplastic resins, with Poly-ether-ether-ketone (PEEK).

The widespread use of composite materials in current aerospace programs has led to noticeable weight savings, estimated to be around 30%. This success has now led to the expansion of composites to more intricate aerospace components, like fuselages, aiming for further weight reduction. Another significant area is the use of 'smart' materials and structures for functions beyond structural support, such as structural health monitoring, vibration control, and aerodynamic manipulation. Future aerospace composites are expected to be highly optimized and smart. The advancement materials, and computer technologies will make the designing of these structures an affordable choice.



**KUMARAGURU**  
college of technology

COIMBATORE – 641 049

## Department of Mechanical Engineering

### INSTITUTE VISION:

The vision of the college is to become a technical university of International Standards through continuous improvement.

### INSTITUTE MISSION:

Kumaraguru College of Technology (KCT) is committed to providing quality Education and Training in Engineering and Technology to prepare students for life and work equipping them to contribute to the technological, economic, and social development of India. The College pursues excellence in providing training to develop a sense of professional responsibility, social and cultural awareness and set students on the path to leadership.

### DEPARTMENT VISION:

To emerge as a centre, that imparts quality higher education through the programme in the field of Mechanical Engineering and to meet the changing needs of the society.

### DEPARTMENT MISSION:

The department involves in sustained curricular and co-curricular activities with competent faculty through teaching and research that generates technically capable Mechanical Engineering professionals to serve the society with delight and gratification.

## B. E. MECHANICAL ENGINEERING

### PROGRAM EDUCATIONAL OUTCOMES (PEO's):

- PEO 1 :** Graduates will take up career in manufacturing and design related disciplines.
- PEO 2 :** Graduates will be involved in the execution of Mechanical Engineering projects.
- PEO 3 :** Graduates will take up educational programme in mastering Mechanical sciences and management studies.

### PROGRAM OUTCOMES (PO's):

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and teamwork:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

## PROGRAM SPECIFIC OUTCOMES (PSO's):

1. Apply the fundamentals of science and mathematics to solve complex problems in the field of design and thermal sciences.
2. Apply the concepts of production planning and industrial engineering techniques in the field of manufacturing engineering.

## M. E. INDUSTRIAL ENGINEERING

## PROGRAM EDUCATIONAL OBJECTIVES (PEO's):

- PEO 1 :** Graduates will be mid to higher level management / engineering professionals with responsibilities in engineering management, data analysis and business operations.
- PEO 2 :** Graduates will be engineering professionals, and technology leaders who would manage such functions as plant engineering, production, supply chain and quality management.
- PEO3 :** Graduates would function as educators or researchers in academic institutions.

## PROGRAM OUTCOMES (PO's):

- P01 :** An ability to independently carry out research /investigation and development work to solve practical problems.
- P02 :** An ability to write and present a substantial technical report/document.
- P03 :** Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program.
- P04 :** Apply knowledge and competencies in manufacturing, analytics, supply chain, quality and engineering management.
- P05 :** Apply principles of industrial engineering to solve problems in industry.
- P06 :** An ability to work as part of interdisciplinary teams, communicate effectively, model and design engineering systems optimally.