

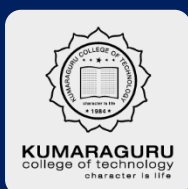
# MEXPRESS

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Mechanical Engineering Department's Official Newsletter  
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REACH US AT



Mechanical Engineering Association  
Department of Mechanical Engineering  
KUMARAGURU COLLEGE OF TECHNOLOGY



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## From the Editors...

Dear Readers,

Welcome to the latest edition of our departmental newsletter. This edition highlights the remarkable achievements and activities within our academic community, showcasing our continued commitment to excellence.

Our department successfully organized various programmes, fostering knowledge exchange and collaboration. Our faculty members have served as resource persons at various prestigious events, sharing their expertise and enhancing our institution's reputation. Faculty members have presented their research at key conferences and published extensively in reputed journals, contributing significantly to their fields.

This period has seen our faculty receive several prestigious awards, acknowledging their contributions to education and research. Our department engaged in collaborative research activities, leading to innovation and the granting of several patents.

Our students have excelled in academic and extracurricular activities, including internships, competitions, and writing insightful articles featured in this edition. The recent alumni meet was a great success, reconnecting former students with each other and our department.

As you read through this edition, we hope you share in the pride we feel for the accomplishments of our faculty, students, and alumni.

Happy Reading!

Warm regards,

**Editors....**



## PROGRAMMES ORGANIZED



Orientation programmes for the immersion for pre-final year and final year students on 10-07-2024 and for second year students of department on 16-07-2024 respectively. **Dr. V. R. Murugantham**, Associate Professor and **Dr. M. A. Vinayagamoorthi**, Assistant Professor – III, coordinated the orientation programmes.



## FACULTY AS RESOURCE PERSONS



**Dr. K. Krishnamoorthi**, Assistant Professor – III, acted as a doctor committee member in a doctoral committee meeting held at SNS College of Engineering on 25-07-2024.

## PAPER PRESENTATIONS (FACULTY)

**Dr. K. K. Arun**, Assistant Professor – III, presented a paper titled “Evaluation of wear behavior on AISI 431 by vacuum annealing method for sustainable applications” in E3S Web of Conferences 552, 01005 (2024) conducted by EDP Sciences on 19-07-2024.



## FACULTY PUBLICATIONS



**Dr. B. N. Sreeharan**, Assistant Professor – III, published a paper titled “Simulation based swarm intelligence optimization to develop manufacturing distribution plan” in a Scopus and Web of Science indexed International Journal on Interactive Design and Manufacturing (IJIDeM). <https://doi.org/10.1007/s12008-024-01980-2>

**Dr. V. Manivel Muralidaran**, Assistant Professor – III, **Dr. S. Thirumurugaveerakumar**, Associate Professor, and **Dr. S. Ramanathan**, Assistant Professor – III, published their paper entitled “Design and Analysis of Automated Film Roll Cutter” in the Scopus indexed International Journal on Engineering Proceedings. <https://doi.org/10.3390/engproc2024066030>.



**Mr. V. R. Navaeeth**, Assistant Professor – II, published his paper entitled “Kinetics of Stainless-Steel Material by Plasma nitriding Process for sustainable applications” in E3S Web of Conferences (Scopus Indexed). <https://doi.org/10.1051/e3sconf/202455201006>.

## MANUSCRIPTS REVIEWED



**Dr. K. K. Arun**, Assistant Professor – III, reviewed a manuscript titled “Advanced Vogel's Approximation Method of Agricultural Unbalanced Fuzzy Transportation Problems” for the SCI indexed International Journal of Engineering and Advanced Technology (IJEAT).

**Dr. V. Manivel Muralidaran**, Assistant Professor – III, reviewed following manuscripts as detailed below



- “Investigation of cooling mechanism and drills wear of low-frequency axial vibration drilling of titanium alloy” for the SCI indexed Journal of Mechanical Science and Technology.
- “A method: multi-scale calculation life of welded beams with residual stress” for the SCI indexed International Journal Engineering Research Express.



**Dr. B. N. Sreeharan**, Assistant Professor – III, reviewed following manuscripts as detailed below

- “Study on Microstructure and Mechanical Properties of 5052 Aluminum Alloy MIG Welded Joint for High-Speed Train” for the SCI indexed International Journal Engineering Research Express
- “Optimization study of single point incremental forming process of low carbon steel/CP-Titanium bimetallic sheets using grey relational analysis and response surface methodology” for the SCI indexed International Journal Brazilian Society of Mechanical Sciences and Engineering (BMSE).

## AWARDS RECEIVED



**Dr. V. Muthukumar**, Professor, **Dr. S. Balaji**, Assistant Professor – III, and **Dr. P. S. Samuel Ratna Kumar**, Assistant Professor – III, received awards for the Faculty Contributors for Research Contributions for KCIRI on 27-07-2024.



# Department Activities

## BOOK CHAPTER PUBLICATIONS



**Dr. V. Muthukumaran**, Professor, published a book chapter titled "Investigation of surface hardness of AISI 316L SS from QPQ complex salt bath treatment process using response surface methodology" in the book 'Challenges and Opportunities in Industrial and Mechanical Engineering: A Progressive Research Outlook' published by Taylor & Francis, bearing ISBN 9781032713229.

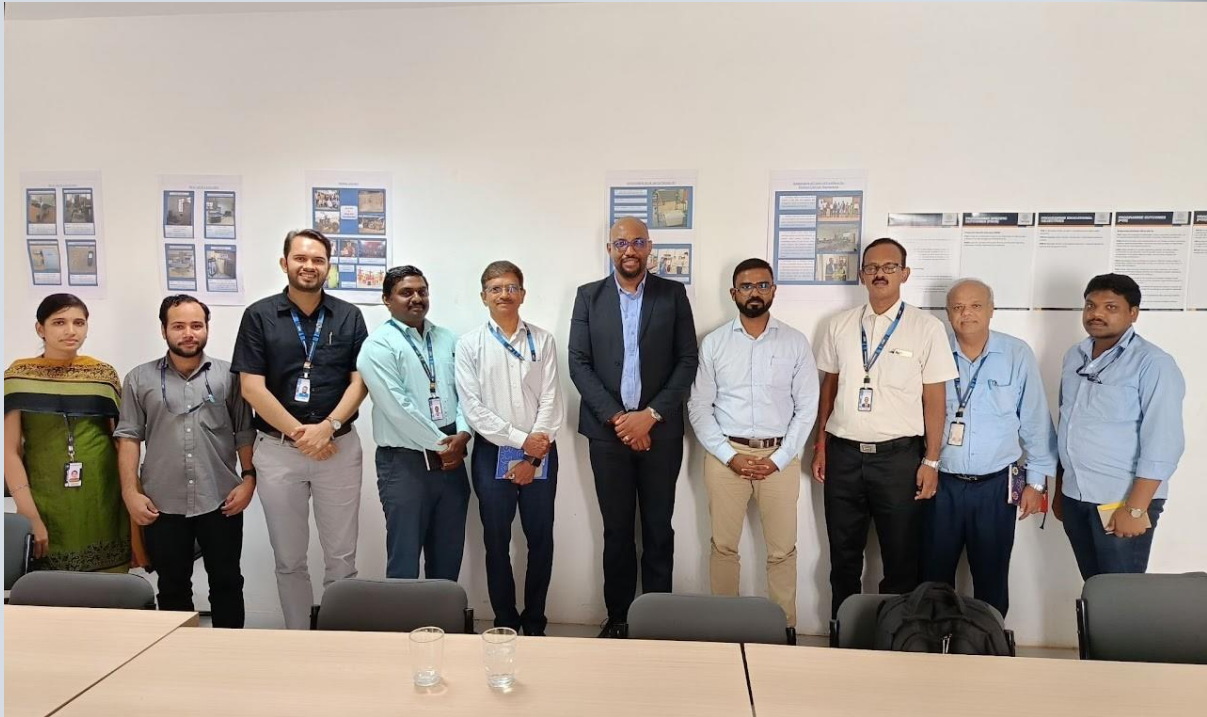
## COLLABORATIVE ACTIVITY



Training and Interaction with PK Fokam Institute, Cameroon was initiated by **Dr. S. Bhaskar**, Associate Professor and Associate Dean, KLDA and **Dr. P. S. Samuel Ratna Kumar**, Assistant Professor – III, at PK Fokam Institute of Excellence, Cameroon from 08-07-2024 to 14-07-2024.







Collaborations with the University of Johannesburg (UJ) was initiated on 03-06-2024. **Dr. PM Mashinini** from the University visited and provided the groundwork for future collaborations aimed at enhancing educational and research opportunities for students and faculty alike. It was a major step towards developing academic relationships and encouraging international student mobility. Collaborations was initiated and coordinated by **Dr. P. S. Samuel Ratna Kumar**, Assistant Professor – III.

### PATENTS GRANTED

A Patent bearing no. 384172-001 on “Autonomous Surveillance Robot” was granted to **Dr. V. Muthukumar**, Professor, **Dr. K. M. Senthilkumar**, Associate Professor, **Dr. S. Balaji**, Assistant Professor – III.



Another patent bearing no. 416040-001 on “Tyre pressure control system for the vehicle wheel” was granted to **Dr. K. M. Senthilkumar**, Associate Professor.

## FACULTY PARTICIPATIONS



**Dr. K. M. Senthilkumar**, Associate Professor, participated in an FDP on Electric Vehicle (Mech) from 03-06-2024 to 02-07-2024, organized by SkillDzire.

**Dr. M. Balaji**, Associate Professor, participated in an FDP on Advanced Materials and Technologies: Bridging Innovations in civil and mechanical engineering from 08-07-2024 to 13-07-2024, organized by Sree Sakthi Engineering College, Coimbatore. He also completed in a Refresher Course on Two Credit Course on Professional Ethics for Higher Education Teachers from 08-01-2024 to 28-06-2024, organized by Swayam, NITTR Bhopal. Further, Dr. Balaji, Associate Professor, participated in a Webinar on Product Innovation and Startup Funding Opportunities on 11-07-2024, organized by PPG Institute of Technology, Coimbatore.



**Dr. B. N. Sreeharan**, Assistant Professor III, participated in an FDP on Advances in Materials and Manufacturing from 15-07-2024 to 19-07-2024, organized by VNR Vignana Jyothi Institute of Engineering & Technology, Bachupally.

**Dr. S. Balaji**, Assistant Professor III, participated in an FDP on Electric Vehicle (Mech) from 03-06-2024 to 02-07-2024, organized by SkillDzire.



**Dr. S. Sivakumar**, Assistant Professor III, participated in an FDP on Defence and Aerospace Systems from 01-07-2024 to 05-07-2024, organized by M/s. Data patterns (India) Limited, Chennai.

**Dr. V. Muthukumaran**, Professor, participated in an FDP on Electric Vehicle (Mech) from 03-06-2024 to 02-07-2024, organized by SkillDzire.



**Dr. V. Manivel Muralidaran**, Assistant Professor III, participated in an FDP on Defence and Aerospace Systems from 01-07-2024 to 05-07-2024, organized by M/s. Data patterns (India) Limited, Chennai.

## Department Activities



**Mr. P. Karthi**, Assistant Professor I, participated in a Webinar on Excel for Beginners on 15-07-2024, organized by UdeMy. He also participated in another Webinar on MO - 200 Microsoft excel 365/ 2019 associate certification on 12-07-2024, organized by UdeMy.

### STUDENT PARTICIPATIONS



**Ms. E. Thiruvazhagi** (22BME120), **Ms. S. Fathima Nasiha** (22BME025), and **Ms. M. Kamalika** (22BME043) from third year mechanical engineering participated in THEERVU'ATHON `24 National level Inter Collegiate Hackathon on 6th August 2024 in PSG College of Arts & Science, Coimbatore.

**Mr. K. Praveen**, 23BME073, participated in the following events.

- Presented a paper titled "Artificial intelligence in health care" at RED NATION 2K24 organized by Bannari Amman Institute of Technology.
- Presented another paper titled "The roles of natural dyes in sustainable manufacturing" in the Technical Symposium - TEXCELLENCE 2024 organized by Sardar Vallabhbhai Patel International School of Textiles and Management.

## Department Activities

- Presented one more paper titled “Hyperloop Transportation” in the MECHNOTRON 2K24 - National Level Symposium, organized by Coimbatore Institute of Technology, Coimbatore.
- Presented a paper titled "Renewable resources - current status and future potentials" at the CONVERGENCE 2K24 - National Level Symposium, organized by Nehru Institute of Technology.



- Speech Competition in Tamil at Coimbatore Book Festival, CODISSIA on 26-07-2024.
- Participated and Won first prize in Hackathon at MECHNOTRON 2K24 - National Level Symposium, organized by Coimbatore Institute of Technology, Coimbatore.

**Mr. T. Suresh**, (23PME01R), completed an online course on “Material Characterization” from 29-01-2024 to 16-04-2024 conducted by NPTEL.



**Mr. P. Surya** (22BME116) from third Year mechanical engineering won 1st prize in SOUTH INDIA YOGASANA CHAMPIONSHIP - 2024 on 28th July, at AKG mahal, Mettu street, Kanchipuram.

**Mr. L. K. Vikkram** (22BME124) and **Mr. C. Pratheesh Hariharan** (22BME075) members from Renew team participated in Asia-Pacific Shell Eco-marathon 2024 to build the most energy efficient vehicle on the selected category and class under prototype category with Class: Hydrogen Fuel cell from July 2nd to July 6<sup>th</sup>, 2024.

## INTERNSHIPS

149 current third year students underwent internship in the following industries during their summer vacation.

1. The Acetech Machinery Components India Pvt Ltd, Annur	24. KCIRI, Coimbatore
2. Admire automation controls, Coimbatore	25. Kinowave, Coimbatore
3. Agni Laser Cutting, Coimbatore	26. Mechman, Coimbatore
4. Anaamalais Toyota, Trichy	27. NLC India Ltd , Neyveli
5. Anandham Industries, Coimbatore	28. PRD Rigs India Limited, Tiruchengode
6. Aquasub Engineering, Thudiyalur	29. Precision Machine Tools, Coimbatore
7. Ashok Leyland Plant-1, Hosur	30. Prokop Eltex (India) Pvt. Ltd, Coimbatore
8. Ashok Leyland 2, Hosur	31. Sabhari Electroplaters, Coimbatore
9. Autotech Industries Private Limited, Chennai	32. Sakthi Auto Ancillary Private Limited, Coimbatore
10. Balaji Engineering, Coimbatore	33. Salzer Electronics, Coimbatore
11. Barani hydraulics Pvt Ltd, Coimbatore	34. SGA Cars, Coimbatore
12. Bhairavi motors, Salem	35. Sri Balaji Spinning Mills, Coimbatore
13. Cochin shipyard, Kerala	36. Siva Ganapathy Industries, Coimbatore
14. Cubic Engineering, Coimbatore	37. Southern Heat Exchangers, Coimbatore
15. Deccan industries, Coimbatore	38. Sree Annamalai Engineering, Coimbatore
16. Deccan Pumps Private Limited, Coimbatore	39. Sree Laxmi Technocast, Coimbatore
17. Go Thrive Technologies (OPC) Private Limited, Coimbatore	40. SRF Limited, Chennai
18. Hirotec India Private Limited, Coimbatore	41. Sri Kumaran Industries, Coimbatore
19. Hitek Heavy Equipments, Trichy	42. Steel Authority India Limited, Salem
20. ISRO, Mahendragiri	43. Super Auto Forge, Chennai
21. JBM Industries, Bengaluru	44. Titan company, Hosur
22. Jeyam Engineering and Tools, Coimbatore	45. Trivikram Flowtech, Coimbatore
23. Karthikeya Industries, Coimbatore	46. Uno Minda, Hosur
	47. Zeekers Technology Solutions Private Limited, Coimbatore



Industrial internship assessment for III-year Mechanical Engineering students was conducted on 24-07-2024 and 26-07-2024. It was organized by **Mr. P. D. Devan**, Assistant Professor-II. The following industrial experts were assessed the internship outcomes.

1. **Mr. V. Sundar**, Proprietor, Shri Varshni Technologies, Coimbatore
2. **Mr. P. Suresh**, Proprietor, Hi-Tech Group of Companies, Coimbatore

## STUDENT ARTICLES

### Vertical Take Off and Landing Engine of F-35B Lightning II fighter jet:



**Suriya Prakash U**  
22BME114

It is known that Air Transport includes Aeroplanes and Helicopters. An aeroplane takes off by covering some distance in the runway and elevating in some inclination with the ground level since the aircraft or jet engine is orientated parallel with the horizontal, whereas the helicopter takes off vertically by the rotational motion of its rotor. Rotor pushes the air downwards and thus helicopter move upwards by the Newton's third law of motion. ( $F_{\text{upward}} = F_{\text{downward}}$ ).

There is one fighter jet which takes off and lands vertically. The engine used is called as Vertical Take Off and Landing Engine. The F-35B Lightning II, the variant of the F-35 owned by U.S. Military forces uses a mechanism for vertical take off and landing known as Shaft Driven Lift Fan System. This system consists of Lift-Fan, roll posts, 3-Bearing Swivel Module (3BSM), Powerful Engine.



- Lift Fan located behind the cockpit is driven by a shaft connected to the main engine. When activated, it provides vertical thrust by drawing in air from above and expelling it downward.
- Roll posts are small nozzles located on the wings that help stabilize the aircraft during vertical take-off and landing by providing additional control.
- 3BSM redirects the main engine's thrust downward for vertical lift or rearward for conventional flight.
- The Pratt & Whitney F135 engine generates the necessary thrust for both vertical and conventional flight modes.

3BSM can rotate the nozzle of about 95 degrees in the duration of 2.5 seconds and redirects the engine thrust downward. While lift fans behind the cockpit and wings together produce 40,000 pounds of vertical thrust by the energy generated by the F-35's single engine.

## ALUMNI MEET



Silver Jubilee Celebration for the batch 1995 – 1999 was celebrated on 27-07-2024. 20 alumni participated in the celebration. Discussed with Placement, Internship, Syllabus collaboration and outcomes.

## SNAP SHOTS



Faculty members @ PKFokam Institute of Excellence, Cameroon



## Internship Assessment





**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.