

MEXPRESS

Mechanical Engineering Department's Official Newsletter

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KUMARAGURU
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Mechanical Engineering Association
DEPARTMENT OF MECHANICAL ENGINEERING



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From the Editors...

Dear Readers,

Welcome to the MExpress Vol. No. 06 and Issue No. 12 Editor's Page! In this edition, we are pleased to showcase the diverse and impactful activities that have shaped our department over the past period. From academic programs to research accomplishments and collaborative ventures, we present a glimpse of the dynamic environment.

We take pride in the successful execution of a range of programs that cater to diverse interests and domains. These programs have been designed to foster learning, innovation, and networking among students and faculty alike. Our esteemed faculty members have continued to contribute their expertise as resource persons in various workshops, seminars, and conferences. Sharing their knowledge and experience, they have enriched the academic landscape of our department and institution as well.

Our researchers have been active participants in conferences and symposia, presenting their cutting-edge research to peers from around the world. Their presentations have highlighted our department's commitment to advancing knowledge. We celebrate the achievements of our faculty and researchers who have contributed their findings to scholarly journals of repute. Their published papers are a testament to our institution's commitment to research excellence.

Our faculty members have not only contributed to journal publications but have also authored chapters in noteworthy books, sharing their insights and expertise on critical subjects. The academic rigor of our institution is reflected in the fact that our faculty members have been sought-after reviewers for manuscripts submitted to renowned journals, contributing to the peer-review process.

We take pride in the recognition our faculty member has received. Our faculty have been honored with a award that acknowledge her outstanding contributions in academia and beyond. Collaboration lies at the heart of innovation. We highlight the successful collaborative venture our department has undertaken with other institution fostering interdisciplinary growth.

Participation in external programs is a testament to our commitment to continuous learning. We share insights from the various programs our students and faculty members have engaged with, enriching their knowledge and perspectives. Our institution's dedication to fostering partnerships is reflected in the Memoranda of Understanding (MoUs) we have established with other industries and institutions. These agreements signify our commitment to collaborative growth.

Two of our esteemed faculty members participated in the prestigious Summer Faculty Research Fellowship at IIT Delhi, contributing to a vibrant exchange of ideas and research insights. Capturing moments that define our institution's vibrancy, our "Snap Shots" section offers a visual journey through key events, workshops, seminars, and memorable occasions.

Our students are at the heart of everything we do. We showcase their participation in extracurricular activities, competitions, and community engagement initiatives that contribute to their holistic development.

As a reminder of our institutional and departmental ethos, we revisit our Vision, Mission, Program Outcomes (POs), Program Specific Outcomes (PSOs), and Program Educational Objectives (PEOs), reaffirming our commitment to excellence.

Thank you for joining us on this journey of exploration and learning. We hope this edition of the newsletter provides you with insights into the dynamic landscape of our department and its ongoing contributions to education, research, and collaboration.

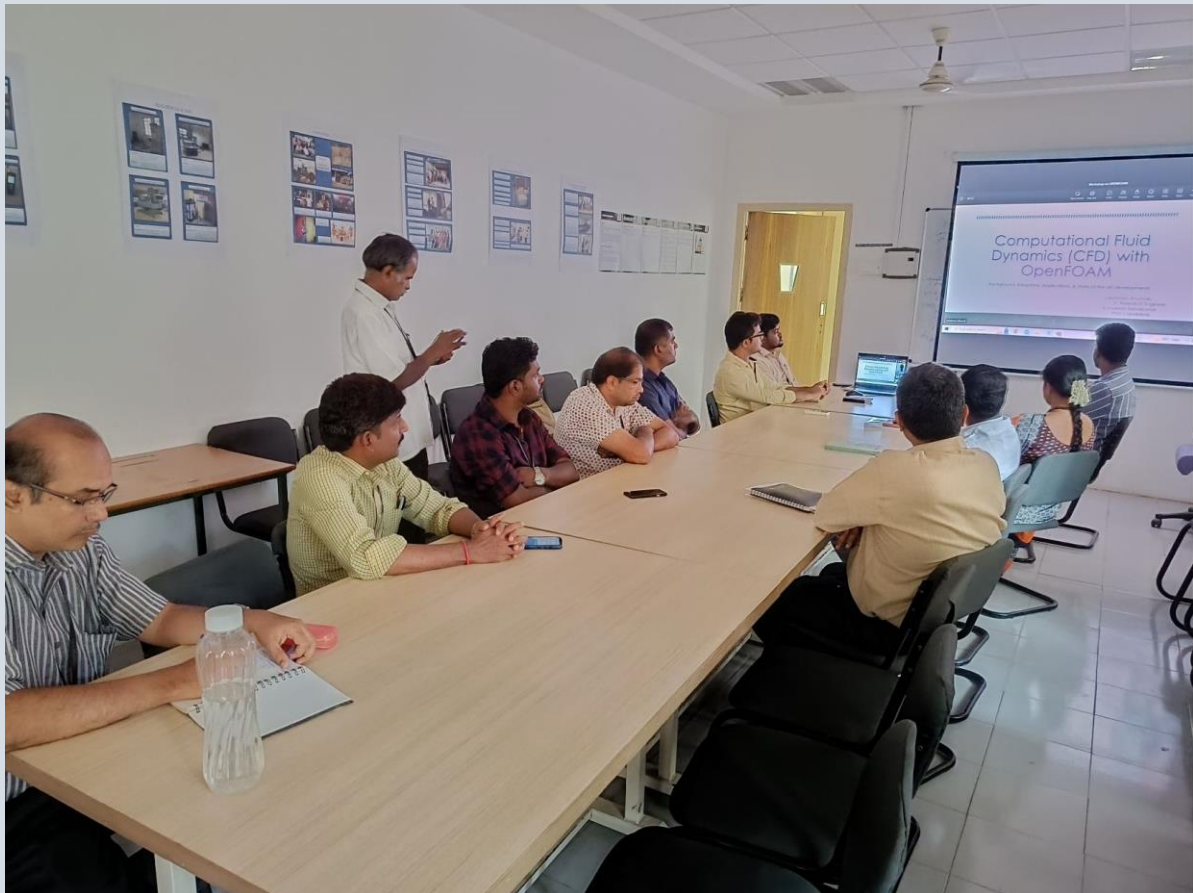
Best regards,

Editors....



PROGRAMMES ORGANIZED

A workshop on “**Industrial application of Open Foam software**” was organized on 17-07-2023. **Dr. Lakshman Anumolu**, Sr. Research Engineer at Convergent Science, University of Wisconsin-Madison, USA & **Mr. Kumaresh**, Engineer, Hyundai, South Korea were the resource persons.



Dr. P. S. Samuel Ratna Kumar, Assistant Professor – 1, coordinated the workshop. First DC meeting for the research scholar of **Dr. P. S. Samuel Ratna Kumar**, Assistant Professor – II, was organized on 28-07-2023. **Dr. Balaji Ayyanar**, CIT and **Dr. Edwin Sudhagar**, VIT were the DC committee members who participated.

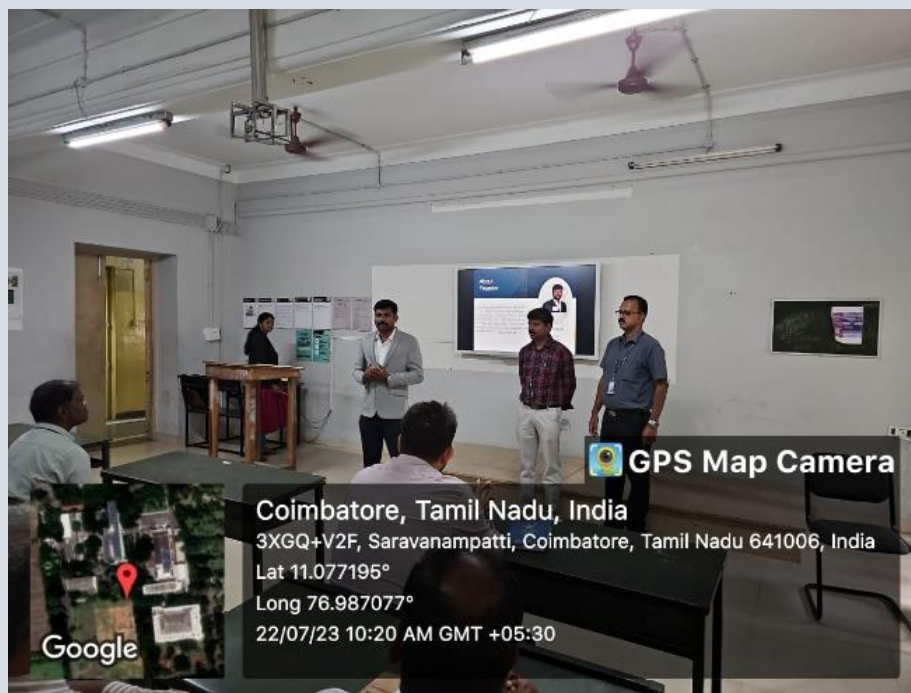
A One-Day Training Programme on “**First Aid Awareness for Supporting Staff**” was organized on 25-07-2023. A Certified First Aid Trainer from Coimbatore Productivity council handled the training programme.

Dr. V. R. Muruganantham, Associate Professor and **Mr. K. Murugesan**, Assistant Professor – II, Department of Mechatronics Engineering were the coordinators for the training programmes.





An Awareness on "Fire Safety Practices for Supporting Staff" was organized on 22-07-2023. A Certified Trainer from M/s. SRS Enterprises created the awareness.



Dr. S. Bhaskar, Associate Professor, **Mr. T. R. Sukumar**, Associate Professor and **Dr. M. A. Vinayagamoorthis**, Assistant Professor – II, were the coordinators.





First DC meeting for the research scholar of **Dr. M. Balaji** was organized on 20-07-2023. **Dr. P. Rajmohan**, Anna University, Chennai & **Dr. PS. Sakthivel**, SASTRA University, Tanjore were the DC members participated. And Second DC Meeting for another research scholar was conducted on 26-07-2023. **Dr. Rajesh Ranganathan**, CIT & **Dr. Leo Dev Wins**, Karunya University and **Dr. Arulmozhi**, Avinashilingam University were DC members.

FACULTY AS RESOURCE PERSONS



Dr. S. Bhaskar, Associate Professor, delivered a guest lecture on “5-S Implementation” at Sakthi Polytechnic College, Sakthi Nagar on 14-07-2023.

Dr. V. R. Muruganantham, Associate Professor, acted as External Examiner at Government College of Technology, Coimbatore on 17-07-2023.



PAPER PRESENTATIONS

Dr. N. Sangeetha, Sr. Associate Professor, presented her paper entitled “Vibration Analysis of Washing Machine under Various Unbalanced Mass” in the International Conference on Advancements in Electrical, Electronics, Communication, Computing and Automation” ICAECA 2023 conducted during 16th – 17th June 2023 organized by Kumaraguru College of Technology and IEEE.



PAPER PUBLICATIONS



Dr. P. S. Samuel Ratna Kumar, Assistant Professor – I, published his paper entitled “Tribological behavior of friction stir process surface hybrid composite AA5083/MWCNT/Al₂SiO₅ using multi-quadratic RBF algorithm” in Carbon Letters, A Springer Publications bearing <https://doi.org/10.1007/s42823-023-00577-1> which is also indexed in SCI & Scopus with impact factor of 4.5. Paper was coauthored by Dr. Mashinini, University of Johannesburg & Dr. Vaira Vignesh, Amrita University

BOOK CHAPTER PUBLICATIONS

Dr. S. Thirumurugaveerakumar, Associate Professor, **Dr. V. Manivelmuralidaran**, Assistant Professor - III and **Dr. S. Ramanathan**, Assistant Professor – III published a book chapter titled “A Case Study of Bus Bar Heat Transfer Optimization Using Taguchi Technique for Low Tension Application” in the book “Intelligent Manufacturing Systems in Industry 4.0” published by Springer, Lecture Notes in Mechanical Engineering, Singapore, pp. 699-710 bearing ISBN 978-981-99-1664-1.



Mr. B. Jeeva, Assistant Professor – II, published a book chapter titled “Mechanical Seed Implanter for Sunflower and Groundnut Seeds: Design and Fabrication” in the book “Intelligent Manufacturing Systems in Industry 4.0” published by Springer, Lecture Notes in Mechanical Engineering, Singapore, pp. 323-332 bearing ISBN 978-981-99-1664-1.

MANUSCRIPTS REVIEWED

Dr. P. S. Samuel Ratna Kumar, Assistant Professor – I reviewed the manuscripts as detailed below.



1. Synthesis of tungsten carbides in a copper matrix by Spark Plasma Sintering and properties of the consolidated materials for the Journal Materials a SCI & Scopus indexed International Journal.
2. Numerical simulation and experimental study on pitting damage of IN625 laser cladding layer for the Part J: Journal of Engineering Tribology a SCI & Scopus indexed International Journal.
3. Impact of Silicon Steel Laminating Materials in Modified Segmented Rotor Switched Reluctance Motor – Electromagnetic and Vibrational Analysis for the Journal of Vibration Engineering & Technologies a SCI & Scopus indexed International Journal.

AWARDS RECEIVED



Dr. N. Sangeetha, Senior Associate Professor received an award titled "Faculty Contributor of the year 2022-23, from KCT-KCIRI on 27-07-2023 for the technical support for successful completion of Aerospace and defence research projects.

COLLABORATIVE ACTIVITIES

A collaborative activity on "Laser additive manufacturing of multiphase metal matrix nanocomposite materials" was initiated with University of Johannesburg, Johannesburg - South Africa. **Dr. P. S. Samuel Ratna Kumar**, Assistant Professor – I is the collaborator. The activity is supported by University Research Committee (URC): Engineering & Built Environment. Collaborative work is for 2-year duration which ends by 30-04-2025.



PROGRAMMES PARTICIPATED



Mr. S. Sivakumar, Assistant Professor – II, participated in an STTP on "Summer Faculty Research Fellowship" from 16-05-2023 to 14-07-2023, organized by IIT-Delhi, Indian Institute of Technology- New Delhi-110016.

Mr. P. Pradeep, Assistant Professor - II participated, in a Workshop on "Mechanical Property Evaluation Using Subsize and Miniature Specimens" on 17-07-2023, organized by IIT Chennai, IGCAR.



Dr. V. Manivelmuralidaran, Assistant Professor – III, participated in an STTP on "Summer Faculty Research Fellowship" from 16-05-2023 to 14-07-2023, organized by IIT-Delhi, Indian Institute of Technology- New Delhi-110016.

Dr. S. Rajesh, Assistant Professor - II participated in a Workshop on "Mechanical Property Evaluation Using Subsize and Miniature Specimens" on 17-07-2023, organized by IIT Chennai, IGCAR.





Dr. N. Sangeetha, Senior Associate Professor, participated in a CONCLAVE on "Coimbatore Defence Conclave 2023" on 27-07-2023, organized by KCT - KCIRI, KCT.

Dr. M. Thirumalaimuthukumar, Assistant Professor – III, participated in a Webinar on "Ansys optiSLang - Process Integration & Design Optimization" on 28-07-2023 organized by ARK Info solutions Pvt Ltd.



Dr. P. R. Ayyappan, Assistant Professor (SRG), **Dr. S. Sivakumar**, Assistant Professor – III, **Dr. S. Thirumurugaveerakumar**, Associate Professor and **Mr. A. Muthukumaravel**, Senior Grade Turner visited Book Fair at CODISSIA Trade fair complex on 28-07-2023.



MOU ACTIVITY

On, 26-07-2023, an MoU was signed with **M/s. Wheel India, Chennai** for the purpose of Industrial Visit, Internship / Project, Short-term certification courses related to our industry / products / process, Campus placement also to enable students to participate in events / competitions conducted by WIL on account of TSS Tech day.



Dr. S. Rajesh, Assistant Professor – II, coordinated the event.

Summer Faculty Research Fellowship 2023 @ IIT Delhi

Dr. V. Manivelmuralidaran

Assistant Professor III
Department of Mechanical Engineering
Kumaraguru College of Technology
Coimbatore – 641 035.



The application for the Summer research fellowship 2023 was submitted to QIP/CEP office at IIT Delhi in the month of February 2023 through mail. The provisional list of selected faculty members was released on 14th April 2023. The individual call letter sent on 18/04/2023 through mail.

On 15th May 2023 I started from Coimbatore to reach Delhi and given accommodation in Udayagiri Hostel to pursue the SFRF 2023 at IIT Delhi.

I joined SFRF by 16th May 2023. I pursuing SFRF 2023 at Department of Materials science and Engineering (DMSE) under the mentorship of **Prof. Jayant Jain, Professor, DMSE, IIT Delhi**. I reported to QIP office on 16th May after getting approval for joining from the mentor and submitted the joining report the QIP office.

The research area allotted to me is to collect literature on Magnesium ion batteries. As the energy crisis is booming now a days, the research on Magnesium ion batteries is need of the hour. Hence there is a huge demand for the study on Magnesium ion batteries.

My mentor insisted to publish a review article after conducting the extensive literature survey on Magnesium ion batteries. I am now collecting the literature on Magnesium ion batteries. I have collected nearly 140 journal articles and now I am compiling all to write a review article.

In addition to this work, mentor told me to have a practice of working on the versatile equipment they are having in the laboratory. I learnt to use Tabletop SEM, Vickers hardness tester, Optical microscope and the usage of tubular furnace, optical emission spectrometer, use of automatic polishing machine.

I am very much thankful to our Head of the Department Dr. C. Velmurugan, Professor and Head, Department of Mechanical Engineering, Dr. D. Saravanan Principal, and the Management for the moral support and financial support to motivate me to participate in this SFRF to enrich my research skills. I thank all of them including my family members who are all part of this successful journey to IIT Delhi.



Using Vickers Hardness tester to test the hardness of HSLA 950A steel which was taken from my research work.

Preparing Heat treatment sample in Workshop @ IIT, Delhi.

Evaluating the microstructure of the steel samples using Metallurgical Microscope.



Collecting literature and preparing presentation at central library.

Summer Faculty Research Fellowship 2023 @ IIT Delhi

Mr. S. Sivakumar

Assistant Professor II
Department of Mechanical Engineering
Kumaraguru College of Technology
Coimbatore – 641 049.



The application for the summer research fellowship 2023 was submitted to QIP/CEP office at IIT Delhi in the month of February 2023 through mail. The provisional list of selected faculty members was released on 14th April 2023. The individual call letter sent on 18/04/2023 through mail.

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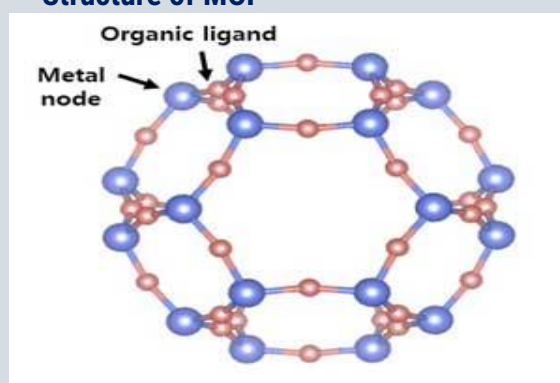
The research area allotted to me is **Synthesis Characterisation and Adsorption study on Metal Organic Framework (MOF)** As the need for Nano composite is booming now a days, the research on **Zeolitic Imidazolate (ZIF-7)** is need of the hour. Hence there is a huge demand for the study on MOF-Nanocomposite.

My mentor insisted to Synthesis and Characterise the nanocomposite after conducting the extensive literature survey on ZIF-7. I am now collecting the literature on ZIF-7. I have collected nearly 50 journal articles and now I am started to Synthesis and Characterise the MOF(ZIF-7).

Definition of MOF:

Class of compounds consisting of metal ions (or) clusters coordinated to organic ligands to form 1-D,2-D and 3-D structures. MOF are Nano porous Materials and possess large internal surface area, forms strong bond between metal and linkers.

Structure of MOF



Applications of Metal Organic Framework (MOF):

1. Gas storage (Hydrogen, Carbon di-oxide)
2. Gas Separation
3. Catalysts
4. Sensors
5. Membranes for wastewater treatment



AT IIT DELHI CAMPUS



AT Department of Materials Science and Engineering-IIT DELHI



The above shot depicts the work during the preparation of ZIF-7 Nano composite in Functional Materials and Membrane lab (DMSE) at IIT-Delhi



The above shot depicts the work during the preparation of ZIF-7 Nano composite in Centrifuge Machine to Settle down the Nano Particles, from the solution.

Characterisation of MOF:



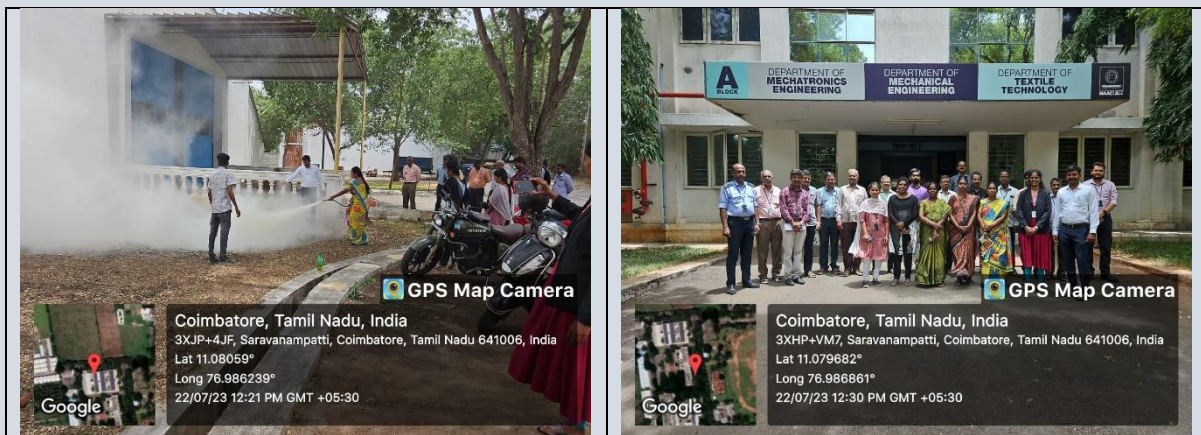
The above shot depicts a photo of BET- Facility at IIT Delhi to measure the pore size and internal surface area of Nano composite.



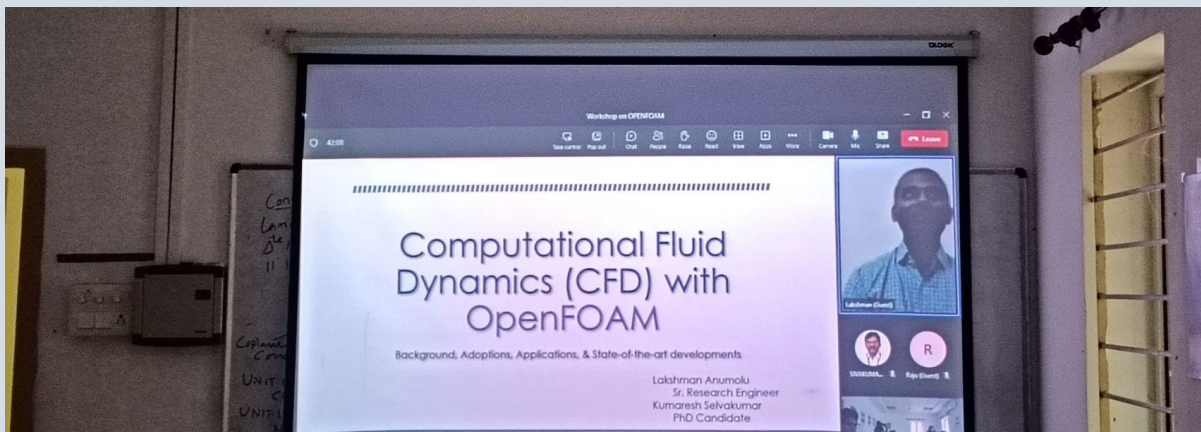
The above shot depicts a photo of Thermogravimetric Analyser Facility at IIT Delhi to measure the mass of the nano particles before and after drying.

I am very much thankful to our Head of the Department, Principal, and the Management for the moral support and financial support to motivate me to participate in this SFRF to enrich my research skills. I thank all of them including my family members who are all part of this successful journey to IIT Delhi.

SNAPSHOTS



Fire Safety Practices for Supporting Staff



Workshop on "Industrial application of Open Foam software"



Training Programme on "First Aid Awareness for Supporting Staff"



MoU signing ceremony with M/s. Wheels India, Chennai



Our faculty members @ Book Fair Exhibition, CODISSIA



Dr. S. Rajesh and Mr. P. Pradeep @ IIT Madras



Mr. S. Sivakumar @ IIT Delhi



Dr. V. Manivelmuralidharan @ IIT Delhi



Dr. N. Sangeetha receiving the award



Dr. AP. Arun, Assistant Professor – III, **Dr. M. A. Vinayagamorrthi**, Assistant Professor – II, **Dr. B. N. Sreeharan**, Assistant Professor – II, **Mr. K. Manikandaprasath**, Assistant Professor – II, **Mr. S. Subbiah**, Assistant Professor – II, **Mr. K. Arumugam**, Supporting Staff, **Mr. Rajendran**, Supporting Staff visited the Agri Intex 2023 at CODISSIA during 14-17th July 2023.

PAPER PUBLICATIONS

Mr. S. L. Vaseekaran, Mr. S. Surendher and Mr. V. Vetriselvan final year students along with **Dr. M. A. Vinayagamoorthis**, Assistant Professor – II, published a paper entitled “A study of sudden discomfort of heart patients by advancing the existing wheelchairs” in the International Journal of Advance Research, Ideas and Innovations in Technology/Volume 9, Issue 2 - V9I2-1396.

PRIZES WON

Team Zeall from KCT, representing KCT participated in the 2nd Season of National level Kart Design & Racing Event organized by Academy of Indigenous Motor Sports at Kari Motors Speedway, Coimbatore at Hindustan Institute of Technology and Karti motor speedway from 7th August 2023 – 9th August 2023. The teams totally bagged about 33,000/- Total Prize amount from Kart Design Racing Event



The following awards has been bagged by our students:

Team E-Zeall:

- Best Business award
- Autocross award
- Skid pad award
- Go green winner
- Light weight award
- Best timekeeper award
- Suprise event award
- Team spirit award
- Overall, Runner Up...!

Team M-Zeall: Best aesthetic award.





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 the 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.