KUMARAGURU
COLLEGE OF TECHNOLOGY

Department of Mechanical Engineering

Newsletter
MExpress

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Mr. B. N. Sreeharan

Associate Editors:
Mr. P. Kapil Anandh
Mr. B. Praveen

Editors, Staff and Students of the Department of Mechanical Engineering wishes a "Happy New Year & Happy Pongal" to the readers....

DEPARTMENTAL ACTIVITIES

PAPERS PRESENTED

- Mr. Jeeva B, Assistant Professor presented a paper titled "Heat transfer enhancement for an Automobile Radiator using Graphene nanofluid: experimental and Numerical Investigation" on Dec 1st 2019 at "International Mechanical Engineering Congress-2019" at National Institute of Technology, Tiruchirappalli.

His paper has been referred to "Journal of Thermal Analysis and Calorimetry for review" by the organizing committee.

- Mr. S. Ramanathan, AP (II) presented a paper entitled "Numerical Investigation of Backflow in Natural Draft Chimneys" in CSIR sponsored International Conference on Advances in Materials Research (ICAMR-2019) held on December 6 & 7, 2019 at Bannari Amman Institute of Technology, Sathyamangalam - 401.

INTERACTION WITH OUTSIDE WORLD

- Mr. S. Sivakumar, AP (II), acted as examiner for the End Semester Examinations for Central Valuation Phase II at Dr. Mahalingam College of Engineering and Technology, Coimbatore during 05.12.2019 and 06.12.2019.

- Mr. M. Ramesh Kumar, Assistant Professor acted as External Examiner for the Autonomous End Semester Practical Examination of Sri Ramakrishna Engineering College, Coimbatore – 641 022 for the Engineering Graphics Lab on 12.12.2019.

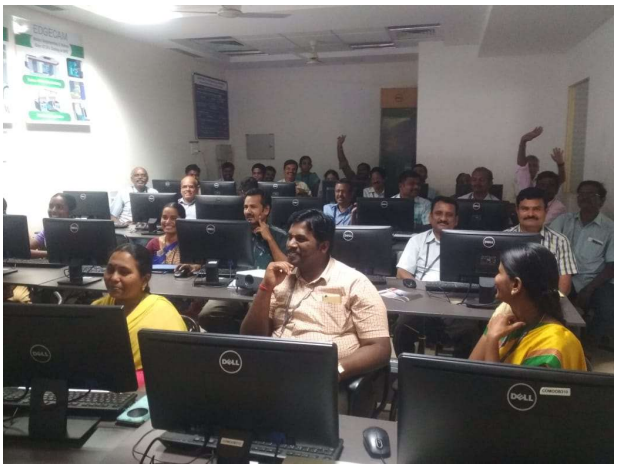
- Dr. S. Balaji, Assistant Professor as External Examiner for the Autonomous End Semester Practical Examination of Sri Ramakrishna Engineering College, Coimbatore – 641 022 for the Computer Aided Engineering Graphics Lab and modelling Simulation Lab on 16.12.2019.

STUDENT MEMBERSHIP

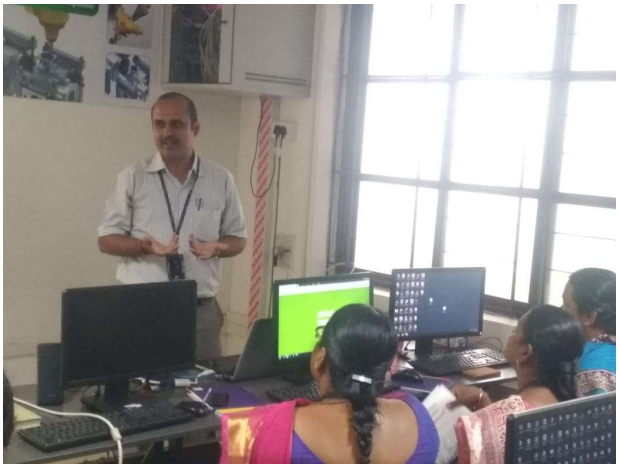
- 24 students from second year registered themselves in the Institution of Engineers – Coimbatore Chapter as Student Members. Dr. S. Balasubramanian, ASP/ME coordinated the activity.

DEPARTMENTAL ACTIVITIES

PROGRAMMES ORGANIZED

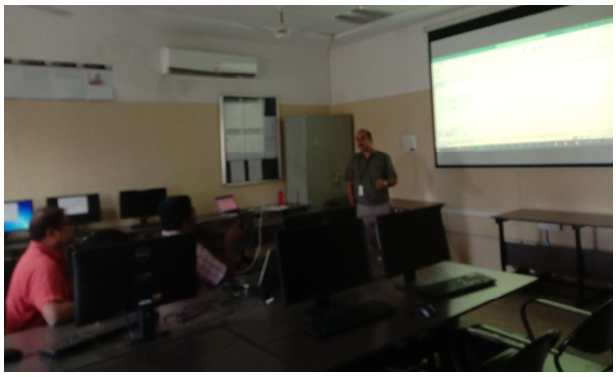


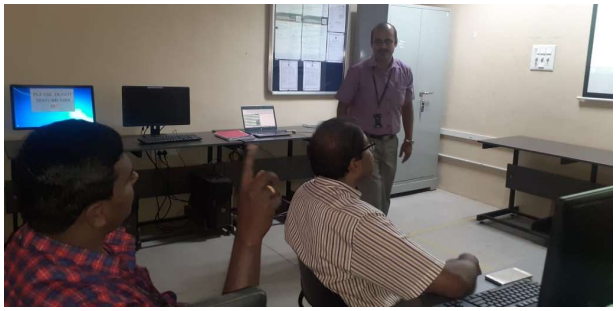
A training programme on "MICROSOFT EXCEL: UNKNOWNS TO KNOWNS – PART 1" was organized at CAM Lab on 24.12.2019 exclusively for the Supporting staff members of our institution.



Mr. B. N. Sreeharan, AP (II) trained the supporting staff members.

- Mr. Sreeharan also trained Dr. S. Thirumuruga Veerakumar, AP (III) and Mr. R. S. Mohan Kumar, Assistant Professor in two separate training programmes titled "Microsoft Excel: Knowns and Unknowns – Part 1 & 2".





Training programmes were conducted on 20.12.2012 and 27.12.2012.

PAPER PUBLICATION

- Dr. S. Balaji, Assistant Professor published a paper entitled "Experimental studies on the performance and emission characteristics of compression ignition engine fueled with jatropha and pongamia biodiesel along with Alumina Nano particles".

DEPARTMENTAL ACTIVITIES

PROGRAMMES ATTENDED

- Dr. K. Ulaganathan, AP (III) had participated in AICTE Sponsored Faculty Development Programme on "Materials – Processing, Characterization and Application, organized by the Department of Mechanical Engineering between 25.11.2019 and 08.12.2019.

- Dr. R. Manivel, Professor had participated in the 2nd training Workshop of AICTE-UKIERI Leadership Development Program between 4th – 7th December 2019 at Jodhpur Institute of Engineering and Technology, Jodhpur, Rajasthan.

- Mr. S. Rajesh, Mr. P. Pradeep, and Mr. S. Suresh, Assistant Professors had participated in "TEQIP-III" sponsored Seven days Faculty Development Programme on "Material Testing and Characterization Techniques for Research", organized by Department of Mechanical Engineering, Government College of Engineering, Bargur during 07th – 13th December 2019.

- Mr. K. Arumugam, Senior Technical Associate had participated in the 17th KCM Below 1600 FIDE rated Chess Tournament at Sri Krishna Kounder Kalyana Manadampam, Coimbatore from 27th to 29th December 2019.

- Dr. K. M. Senthilkumar, Associate Professor had participated and completed successfully AICTE Training and Learning (ATAL) Academy FDP on "Cyber Security" from 16.12.2019 to 20.12.2019 at National Institute of Technology, Karnataka, Surathkal.

STUDENT ACTIVITIES

MECHANICAL ENGINEERING ASSOCIATION

1st Years' Orientation and Recruitment

MEA stepped into its next success story by conducting orientation for the students of 1st year Mechanical Engineering Department. This orientation is aimed at creating awareness about various opportunities present in and out of the department.

Dr. V. R. Muruganantham, Associate Professor, Staff Coordinator addressing the gathering. Students of 1st years were made comfortable with the mesmerizing speech by Mr. K. Arun, President MEA.

Mr. K. Arun, Mr. Aswath, Ms. Rushethra, Mr. Charan, Mr. Kavin Prasanth, Mr. Harish, Mr. Akash Madhavan, Mr. Harish Maran, Mr. Deepan Issac conducted orientation for the 1st years.

On 6th and 7th December 2019. The Mechanical Engineering Association conducted intake process for the first year students. With great excitement and anxiety to be a part of the association, nearly 46 students attended the interview.

This recruitment was a bit different from the others. The seniors themselves interviewed the students which made the process an interesting and enjoyable one.

They carried the process interactively till the last moment. Not only that, the students were asked for their choice of interest and gave interesting tasks in the same. Probation period was assigned to the students and students are actively performing the tasks. Indeed, it was a rhapsodic day for all of them who took part in the recruitment process!

INDUSTRY INSTITUTE INTERACTION

The Department of Mechanical Engineering has arranged the opportunity for the students to become an industry ready engineer. Under this project MEA arranged the intern/inplant training for the mechanical department students in various industry based on the student's approach and their interest.

Roll Number	Name	Organization	Duration	Mode of Training
17BME004	Mr. Karanram S	Adhishree CNC, Coimbatore	7 Days	Inplant Training
17BME023	Mr. Vigneah B	Adhishree CNC, Coimbatore	7 Days	Inplant Training
17BME107	Mr. Raaghul V	Adhishree CNC, Coimbatore	7 Days	Inplant Training
18BME042	Mr. Ananth V L	Adhishree CNC, Coimbatore	7 Days	Inplant Training
18BME008	Mr. Kavinprabhu P	Adhishree CNC, Coimbatore	7 Days	Inplant Training
18BME016	Mr. Lingesh S	Adhishree CNC, Coimbatore	7 Days	Inplant Training
17BME014	Mr. Vikram G	Aquasub Engineering, Coimbatore	7 Days	Inplant Training
17BME062	Mr. George Stephen A	Manchester Honda, Coimbatore	7 Days	Inplant Training
17BME071	Mr. Arjun D	Manchester Honda, Coimbatore	7 Days	Inplant Training
17BME097	Mr. Kishore M S	Manchester Honda, Coimbatore	7 Days	Inplant Training
17BME104	Mr. Rameshkumar R	Manchester Honda, Coimbatore	7 Days	Inplant Training
18BME025	Mr. Hariprasath V	Surfine Tools,Coimbatore	7 Days	Inplant Training
18BME013	Mr. Shrinick PB	Surfine Tools,Coimbatore	7 Days	Inplant Training
18BME026	Mr. Dharun S	Surfine Tools,Coimbatore	7 Days	Inplant Training
17BME164	Mr. Rubakumar K	Susin I Tork, Coimbatore	7 Days	Inplant Training
17BME163	Mr. Kishor Kanna S	Susin I Tork, Coimbatore	7 Days	Inplant Training
17BME157	Mr. Sounder. R	Susin I Tork, Coimbatore	7 Days	Inplant Training
17BME157	Mr. Sounder. R	Thermal power plant, Mettur.	7 Days	Inplant Training
17BME102	Mr. Pramoth M	Thermal power plant, Mettur.	7 Days	Inplant Training
17BME153	Mr. Mohankumar S	Thermal power plant, Mettur.	7 Days	Inplant Training
17BME063	Mr. Abdul Ahadu M	Thermal power plant, Mettur.	7 Days	Inplant Training
16BME242	Mr. R. Rahul Krishnan	Hatsun Agro Limited	90 Days	Internship
17BME212	Mr. Kevin J Pillai	Indian Rare Earths Limited	10 Days	Internship
17BME089	Mr. J. Ajay	Internship Abroad Rwth University,	30 Days	Internship

INDUSTRY INSTITUTE INTERACTION

Roll Number	Name	Organization	Duration	Mode of Training
17BME050	Mr. Nitin D	Hyundai, Chennai	7 Days	Internship
17BME0100	Mr. Pavin Shankar	Hyundai, Chennai	7 Days	Internship
17BME174	Mr. Mohamed Hakkim	Thermal Power Station, Tuticorin	35 Days	Internship
18BME167	Mr. Sanjay V	Acetech Machinery Components	13 Days	Internship
18BME057	Mr. Muthu Vinith L	Tirupur Bus Depot	7 Days	Internship
18BME010	Mr. Aravindh.S	Tirupur Bus Depot	7 Days	Internship
18BME008	Mr. Kavinprabhu P	Tirupur Bus Depot	7 Days	Internship
18BME014	Mr. Karthick S	Tirupur Bus Depot	7 Days	Internship
17BME207	Mr. Harrish. T	Tnpl	7 days	Internship
17BME206	Mr. Aswin. P	Tnpl	7 Days	Internship
17BME208	Mr. Thadchan. M	Tnpl	7 Days	Internship
17BME223	Mr. Kumaran. B	Tnpl	7 Days	Internship
17BME219	Mr. Rohinth. S	Tnpl	7 Days	Internship
18BME174	Mr. Y. Dushyanth	Isuzu Motors India Private Limited	10 Days	Internship
18BME012	Mr. Rishyashringha Vc	Jsw Steels	7 Days	Internship
17BME098	Mr. Devadath S Pillai	Kottayam Volkswagen	7 Days	Internship
16BME042	Mr. Arun G P	L&T	60 Days	Internship
16BME051	Mr. Sudarsan R	L&T	60 Days	Internship
17BME098	Mr. Devadath S Pillai	Manchester Honda	7 Days	Internship
18BME122	Mr. Mahesh Kumar U	Bright Foundry	15 Days	Internship
18BME172	Mr. Saranyan B	Bright Foundry	15 Days	Internship
18BME064	Mr. Madhumitta P	Ford Service Centre, Coimbatore	10 Days	Internship
18BME068	Mr. Nandhini V	Ford Service Centre, Coimbatore	10 Days	Internship
18BME090	Mr. Aravindh B	Ford Service Centre, Coimbatore	10 Days	Internship
18BME201	Mr. Karutthu Vinaayaga Iyyappan	Ford Service Centre, Coimbatore	10 Days	Internship
18BME205	Mr. Arun Kumar R	Ford Service Centre, Coimbatore	10 Days	Internship
18BME222	Mr. Akash B	Ford Service Centre, Coimbatore	10 Days	Internship

Student Articles

MAGNETIC LEVITATION

Hemavijay B– 19BME025
1st Year Mechanical – A

Magnetic Levitation or magnetic suspension is a method by which an object is suspended with no support other than magnetic fields.

Magnetic force is used to counteract the effects of the gravitational acceleration and any other accelerations. Similar poles of two magnets repel each other; opposite poles attract each other. These principles govern the levitation of maglev trains. Permanent magnets are always magnetic. Electromagnets are magnetic only when an electric current flow through them.

The principle of magnetic levitation has been known for over 100 years, when American scientists Robert Goddard and Emile Bachelet first conceived of frictionless trains. But though magnetically levitated trains have been the focus of much of the worldwide interest in maglev, the technology is not limited to train travel.

Maglev can be used in variety of engineering services like transportation, environmental, aerospace, nuclear, biomedical etc

Magnetic fields are actively excluded from superconductors. If a small magnet is brought near a superconductor, it will be repelled because induced supercurrents will produce mirror images of each pole.

If a small permanent magnet is placed above a superconductor, it can be levitated by this repulsive force. Levitation currents in the superconductor produce effective magnetic poles that repel and support the magnet. the levitation process is quite remarkable.

Since the levitating currents in the superconductor meet no resistance, they can adjust almost instantly to maintain the levitation. The suspended magnet can be moved, put into oscillation, or even spun rapidly and the levitation currents will adjust to keep it in suspension.

For successful levitation and control of all 6 axes (degrees of freedom; 3 translational and 3 rotational) a combination of permanent magnets and electromagnets or diamagnets or superconductors as well as attractive and repulsive fields can be used.

From Earnshaw's theorem at least one stable axis must be present for the system to levitate successfully, but the other axes can be stabilized using ferromagnetism.

Magnetic levitation as a means of transportation is not without its problems.

For example, initial plans call for the construction of MAGLEV tracks in the United States adjacent to the nation's interstate highway system. But passengers traveling in a 250-mile-per-hour MAGLEV train will feel much stronger gravitational forces in rounding an interstate curve than will passengers in a car moving at 65 mi (105 km) per hour.

Also, initial tests suggest that MAGLEV vehicles may produce a high level of noise when they operate at top speed. Tests have shown that sound levels of 100 decibels at a distance of 80 ft (24 m) from the guideway may be possible. Such levels of sound are, however, unacceptably high for any inhabited area.

Student Articles

PLASMA WELDING

Vivien Wilfred – 19BME009
1st Year Mechanical – A

Plasma Arc Welding (PAW) is an arc welding process that produces coalescence of metals by heating them with an arc between an electrode and the workpiece with shielding from an ionized gas. It is similar to that of Gas Tungsten Arc Welding(GTAW).

Welding Torch: The same basic requirements apply here as for TIG welding. Plasma welding torches are generally water-cooled.

Power source: Plasma welding employs DC, and for aluminium and aluminium alloys also AC, with a drooping characteristic as for TIG welding. Open circuit voltage should be at least 80 V. The high frequency generator

In principle, the purpose of the HF generator is the same as in TIG welding. However, when used in plasma welding, the HF generator does not normally strike the main arc. Instead, it strikes a pilot arc as a non-transferred arc, with the current flowing between the electrode and the plasma nozzle. The pilot arc, in other words, can be maintained in air. As the torch approaches the workpiece, the main arc strikes and the pilot arc is extinguished.

Control equipment: The necessary control equipment depends on to what extent the welding process is mechanised. However, it is usual for the pre-flow and post-flow of the shielding gas, the HF generator and the pilot arc, to be automatically controlled. There is often automatic control to ensure that the arc is struck in pure argon, after which the gas supply changes over to the particular gas that is being used.

Plasma arc welding is an advancement over the GTAW process. This process uses a non-consumable tungsten electrode and an arc constricted through a fine-bore copper nozzle.

PAW can be used to join all metals that are weldable with GTAW. Difficult-to-weld in metals by PAW include bronze, cast iron, lead and magnesium. Both welding processes generally use non consumable tungsten electrodes to carry power to the welding torch and into the orifice gas. The orifice gas represents much of what is different about the GMAW welding process and the PAW welding process.

The design of a PAW torch allows for the orifice gas to build up in a chamber at the end of the torch. The arc heats up the orifice gas to nearly 30,000 degrees Fahrenheit. At this point, the orifice gas turns to plasma and is expelled through a narrow opening at the end of the welding torch.

As in GMAW, a shielding gas surround the weld pool to create an inert environment to keep the weld pool clean and free from oxygen that will rust the metal. Several basic PAW process variations are possible by varying the current, plasma gas-flow rate, and the orifice diameter, including:

- Micro-plasma (< 15 Amperes)
- Melt-in mode (15–100 Amperes)
- Keyhole mode (>100 Amperes)

Student Articles

INDUSTRIAL INTERNET OF THINGS

Padrinarayanan R – 19BME010
1st Year Mechanical – A

IIoT refers to the adjunction and use of Internet of things (IoT) in industrial sectors.

Usage of smart sensors in manufacturing and industrial process is known as Industrial Internet of things (IIoT). Industrial internet of things is a part of Industry 4.0 which would be the next big thing in the revolution of manufacturing and usage of machines.

IIoT reinforces manufacturing and industrial process. IIoT drag the power of smart machines and real time analytics to take advantage of that data. It is a network of intelligent devices which connected to systems that monitor, collect, exchange and analyse data.

IoT applications connect device across multiple verticals inclusive of agriculture, healthcare, smart appliances, fitness bands etc., whereas IIoT connect machines and devices in industries like oil and gas, Automotive industry, utilities and manufacturing.

Big data can be visually monitored which enables companies to responds swiftly to fluctuations in production and demand.

IIoT applications are more concerned with improving efficiency and improving health or safety.

As IIoT devices become smaller, cheaper and smarter they can be applied almost everywhere. The data they create can be turned into actionable that delivers incredible business benefits.

Even though IIoT has a wide range of applications and usage, security concerns and issues arise a lot with it. Additionally, IIoT enable d devices can allow for more traditional forms of cybercrime such data hacking and data breach may happen.

It is the sensors and actuators which is used in place of technicians to increase the quality of product and reduce the rate of errors hence resulting in better efficiency of material produced.

In short, IoT is most commonly used for consumer usage where as IIoT is used for industrial purpose such as manufacturing, monitor and management system of machines. In future we may expect IIoT to be the inevitable tool in manufacturing and maintenance sector of the industries.

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 VISION:

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.

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.

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7. **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.

8. **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.

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 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 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.