MEXPRESS

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Mechanical Engineering Association
DEPARTMENT OF MECHANICAL ENGINEERING

KUMARAGURU college of technology
character is life

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From the Editors…

Dear Readers,

Welcome to the latest edition of our newsletter! We are thrilled to bring you a recap of the exciting activities and achievements that have taken place within our department. As we reflect on the previous month and look forward to the upcoming academic term, we are proud to share the following highlights:

We have successfully organized a diverse range of programs, workshops, and events that have enriched the learning experience of our students and faculty members. These initiatives have focused on fostering knowledge exchange, professional development, and community engagement.

We have been privileged to have our faculty members been hosted as esteemed resource persons who have shared their expertise and insights with our community. Their valuable contributions have enriched the understanding of various subjects and provided inspiration for personal and professional growth.

Our faculty members have actively participated in conferences and symposiums, presenting their innovative ideas and research findings to a wider audience. These presentations have showcased our commitment to pushing the boundaries of knowledge and making impactful contributions to our respective fields. They also had worked diligently to ensure the quality and rigor of the scholarly publications associated with our department. By providing insightful feedback and expert evaluations, they have contributed to the advancement of research and the dissemination of knowledge.

We are proud to announce the publication of a significant book authored by three of our esteemed faculty members. This publication reflects our commitment to knowledge creation and dissemination, as well as our dedication to promoting academic excellence. In addition to the book publication, one of our faculty members has contributed a valuable chapter to an esteemed publication. This accomplishment highlights our faculty's expertise and their engagement with broader academic discourse.

Our faculty members have had the invaluable opportunity to participate in industrial training programs, allowing them to gain practical experience and insights into their respective fields.

Our faculty members have actively engaged in professional development by attending conferences, seminars, and workshops. By keeping themselves abreast of the latest trends and advancements in their fields, they bring enhanced expertise and fresh perspectives to their teaching and research.

We organized an enriching industrial visit, providing students with an up-close look at real-world applications of their academic knowledge. This experience has broadened their horizons and deepened their understanding of industry practices. Our department remains committed to active participation in professional societies, where our faculty and students contribute to the growth and development of their respective disciplines.

In this edition, we present a collection of captivating snapshots that capture the vibrant spirit of our organization. These photos showcase the various events, celebrations, and achievements that have taken place throughout the year.

Looking ahead to the upcoming academic year, we are excited to introduce "Opportune 2023 – 2024," a comprehensive roadmap that helps the students and faculty members to gain the related knowledge. We are pleased to feature an article written by one of our talented students in this edition. These student articles provide valuable insights, showcase their creativity, and offer unique perspectives on topics relevant to their academic pursuits.

We hope you will enjoy this edition of newsletter.

Best regards,

Editors….

PROGRAMMES ORGANIZED

A One-week Training on **"CAD & FEA Using SolidWorks & ANSYS"** was organized in the department from 02-05-2023 to 10-05-2023. **Mr. Abinesh,** from M/s. CADD Solutions was the resource person. The training was coordinated by **Dr. M. A. Vinayagamoorthi,** Assistant Professor – II.

An Industry Specific Training - Capgemini Engineering on **"New Product Development"** was organized in the department from 04-04-2023 to 24-05-2023. Following faculty members were the resource persons:

Mr. J. Sivaguru, Assistant Professor – II, Mechatronics Engineering
Dr. M. A. Vinayagamoorthi, Assistant Professor – II, Mechanical Engineering
Mr G. Rajkumar, Assistant Professor – II, Automobile Engineering,
Mr. S. Subbiah, Assistant Professor – I, Mechanical Engineering
Mr. R. ArunKumar, Assistant Professor – II, Aeronautical Engineering
Dr. N. Sangeetha, Sr. Associate Professor, Mechanical Engineering
Dr. S. Balasubramanian, Associate Professor, Mechanical Engineering
Mr. P. D. Devan, Assistant Professor – II, Mechanical Engineering
Dr. B. N. Sreeharan, Assistant Professor – II, Mechanical Engineering

The industry specific training was coordinated by **Dr. M. A. Vinayagamoorthi,** Assistant Professor – II.

A Seminar on **"Technology of Laser Powder Bed Fusion & its applications"** was organized in the department on 11-05-2023. **Mr. A. Joe Ajay**, BDM, EOS electro optical systems India Private Limited. **Dr. P. S. Samuel Ratna Kumar,** Assistant Professor – I coordinated the seminar.

RESOURCE PERSONS

Dr. B. N. Sreeharan, Assistant Professor – II, was the resource person in the Workshop on **"How to Publish Your Paper?"** organized by the **IEEE - Student Chapter, KCT - Education Wing** on 15-05-2023. He also acted as resource person in a Workshop on **"Business Analytics using MS Excel"** organized by **CARE School of Business, Trichy** on 17-05-2023. Further, Dr. B. N. Sreeharan was one of the resource persons in the Industry Specific NPD Training - Capgemini Engineering. He trained the Trainee Engineers in **"MS Office Packages".** The training was organized by the **Department of Mechanical Engineering, Kumaraguru College of Technology** from 04-04-2023 to 24-05-2023.

Mr. P. D. Devan, Assistant Professor – II, was one of the resource persons in the Industry Specific Training - Capgemini Engineering. He trained the Trainee Engineers in **"Original Equipment Manufacturer".** The training was organized by the **Department of Mechanical Engineering, Kumaraguru College of Technology** from 04-04-2023 to 24-05-2023.

Dr. S. Bhaskar, Associate Dean was the resource person in the Workshop on "**Outcome based Education**" at **SIIMS, Pollachi** on 13-05-2023. He also handled a training session titled **"Joy of learning"** at SEA, Kumaraguru College of Technology on 16-05-2023.

PAPERS PRESENTED

Dr. M. Thirumalaimuthukumaran, Assistant Professor – III, presented a paper titled "Optimization of machining parameters for turning process by using grey relational analysis and runge kutta method" in the International Conference "TAMMIE 2023" organized by KPRIET, Coimbatore under SERB during 05-05-2023 and 06-05-2023.

MANUSCRIPTS REVIEWED

Dr. P. S. Samuel Ratna Kumar, Assistant Professor – I, reviewed a couple of manuscripts as detailed below:

- "Experimental study of the accuracy of the obtained aerodynamic parameters of selected aircraft models made in MJM and FDM technology using an advanced hydrodynamic tunnel" for the SCI indexed International Journal the Materials.
- "Numerical simulation and experimental study on pitting damage of IN625 laser cladding layer" for the SCI indexed International Journal Part J: Journal of Engineering Tribology.

BOOK PUBLISHED

Dr. K. M. Senthilkumar, Associate Professor, **Dr. V. Muthukumaran, Professor,** and **Dr. S. Balaji,** Assistant Professor – II, published a book chapter titled "Introduction to Engineering Materials" published by Scientific International Publishing House bearing ISBN 978-93-5757-205-7.



BOOK CHAPTER PUBLISHED

Dr. S. Thirumurugaveerakumar, Associate Professor, published a book chapter titled "Contemporary Pedagogy in Science and Humanities Contemporary" in the book "Contemporary Pedagogy In Science And Humanities", published by BONFRING, India bearing ISBN 978-93-92537-52-3.

INDUSTRIAL TRAINING

Dr. V. R. Muruganantham, Associate Professor and **Dr. S. Thirumurugaveerakumar,** Associate Professor, attended one-week Industrial Training at **M/s. Ammarun Foundry, Coimbatore** from 22-05-2023 to 27-05-2023.


PROGRAMMES ATTENDED

Mr. S. Subbiah, Assistant Professor I, participated in a One-week training on "CAD & FEA Using Solid Works & ANSYS" from 02-05-2023 to 10-05-2023, organized by Department of Mechanical Engineering, Kumaraguru College of Technology, Coimbatore.

Dr. P. S. Samuel Ratna Kumar, Assistant Professor I, participated in a Conclave on "DRDO-Academia Conclave" from 25-05-2023 to 26-05-2023, organized by DRDO, DRDO Bhawan, New Delhi.

Mr. S. Prabhu, Assistant Professor II, participated in a Two-week workshop on "COVIDYA Startup Sandbox" from 15-05-2023 to 27-05-2023, organized by MaDeIT, IIITDM Kancheepuram. He also attended a national workshop on Green Hydrogen Generation: Research Issues and Opportunities, organized by School of Mechanical Engineering, Shri Mata Vaishno Devi University Katra 182320 UT of J&K, from 27.04.2023 to 28.04.2023.

Mr. P. D. Devan, Assistant Professor II, participated a One-week training on "CAD & FEA Using SolidWorks & ANSYS" from 02-05-2023 to 10-05-2023, organized by Department of Mechanical Engineering, Kumaraguru College of Technology, Coimbatore.

Dr. S. Ramanathan, Assistant Professor III, participated a One-week training on "CAD & FEA Using SolidWorks & ANSYS" from 02-05-2023 to 10-05-2023, organized by Department of Mechanical Engineering, Kum araguru College of Technology, Coimbatore.

Dr. N. Sangeetha, Sr. Associate Professor, participated a One-week training on "CAD & FEA Using SolidWorks & ANSYS" from 02-05-2023 to 10-05-2023, organized by Department of Mechanical Engineering, Kumaraguru College of Technology, Coimbatore.

Dr. M. Thirumalaimuthukumaran, Assistant Professor III, participated a One-week training on "CAD & FEA Using SolidWorks & ANSYS" from 02-05-2023 to 10-05-2023, organized by Department of Mechanical Engineering, Kumaraguru College of Technology, Coimbatore.

Dr. M. A. Vinayagamoorthi, Assistant Professor II, participated a One-week training on "CAD & FEA Using SolidWorks & ANSYS" from 02-05-2023 to 10-05-2023, organized by Department of Mechanical Engineering, Kumaraguru College of Technology, Coimbatore.

Dr. K. M. Senthilkumar, Associate Professor, participated in a Workshop on "Green Hydrogen Generation: Research Issues and Opportunities" from 27-04-2023 to 28-04-2023, organized by School of Mechanical Engineering, Shri Mata Vaishno Devi University Katra UT of J & K.

Dr. K. K. Arun, Assistant Professor III, participated a One-week training on "CAD & FEA Using SolidWorks & ANSYS" from 02-05-2023 to 10-05-2023, organized by Department of Mechanical Engineering, Kumaraguru College of Technology, Coimbatore.

Mr. V. R. Navaneeth, Assistant Professor - II, participated in a Workshop on "Green Hydrogen Generation: Research Issues and Opportunities" from 27-04-2023 to 28-04-2023, organized by School of Mechanical Engineering, Shri Mata Vaishno Devi University Katra UT of J & K.

INDUSTRIAL VISIT

Second year students visited **M/s. Titan Industries, Hosur** as a part of industrial visit during 13-05-2023 and 14-05-2023. **Dr. S. Balasubramanian,** Associate Professor, coordinated the industrial visit.

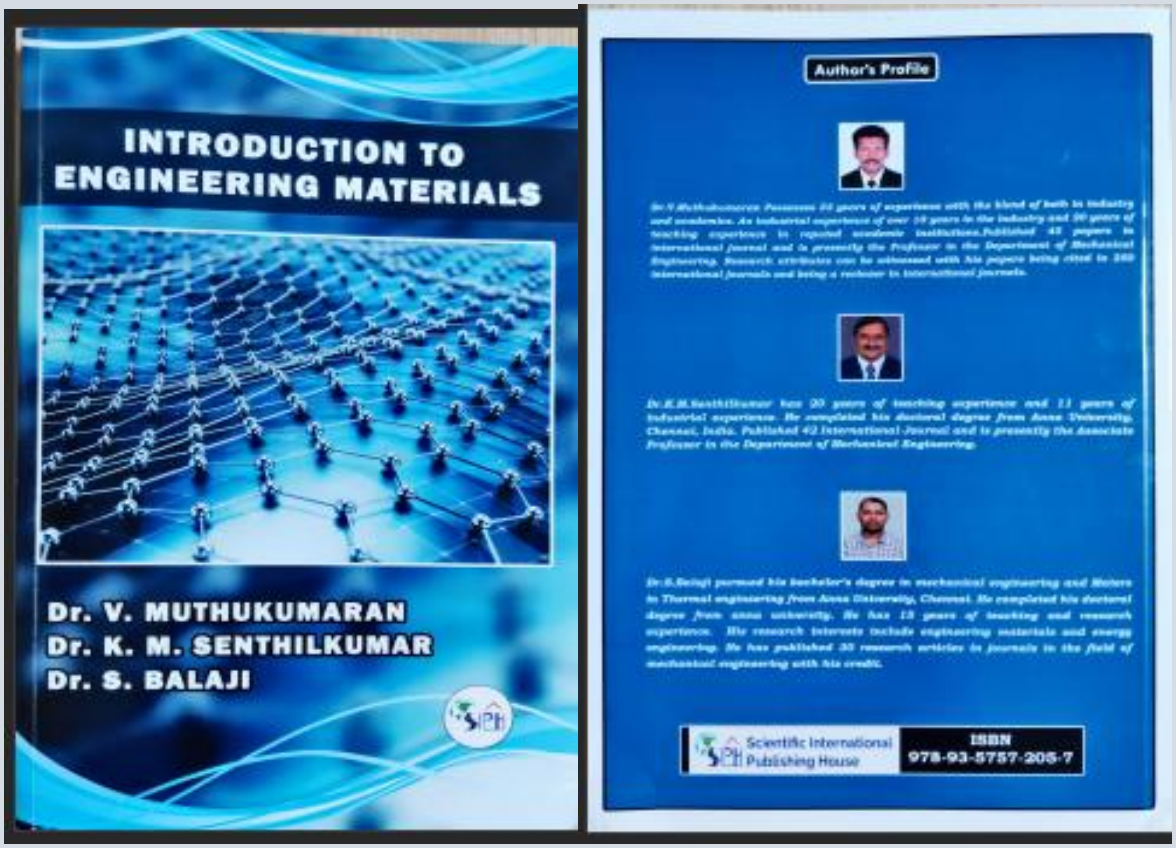
PROFESSIONAL SOCIETY ACTIVITIES

29 new students have enrolled in **Indian Welding Society**, **Students Chapter of KCT**.

SNAPSHOTS

Industrial Visit – M/s. Titan Industries, Hosur

Industry Specific Training – M/s. Capgemini Engineering, Coimbatore



Book Published by our Faculty Members

Dr. Samuel @ DRDO Conclave, New Delhi

Guest Lecture on Additive Manufacturing.

Top Engineers 7 Days International Internship on IC Engines and Electric Vehicles (Hybrid Mode)

Category: Internship/Training
Event Type: Hybrid Mode
Start Date: 25 June 2023
Last Date to Register: 17th June 2023
Location: Chennai.
Organizer: Top Engineers & IIT - Madras.
Registration Fees: INR 1500/-
$100 USD (FOR OTHER COUNTRIES)
PAY RS.100 /- ADVANCE AND BALANCE RS 1400 TO BE PAID AT VENUE
Internship Details: Internship Duration: 7 days
ONLINE MODE: GOOGLE meet platform
OFFLINE VENUE: IIT MADRAS RESEARCH PARK
No.32, Kanagam Road, Kanagam Periyar Nagar, Taramani, Chennai, Tamil Nadu 600113.

Registration will be closed either when all seats are filled or two days prior to the event. We kindly urge you not to wait until the last moment and kindly request you to book your seats soon to avoid disappointment!

CONTACT DETAILS:

MOBILE: 9840728806 / 09940322437.
MAIL: admin@topengineersindia.com.
WEBSITE: https://www.topengineersindia.com

Nano Technology Workshop 2023

Event Type: Hybrid Mode
Start Date: 18th June 2023
Last Date to Register: 16th June 2023
Location: Chennai.
Organizer: Top Engineers & MIT – Anna University.
Registration Fees: INR 999/-
Internship Duration: 1 day

Forenoon Session:

- 09.00 to 10.00 am – Introduction to Nanotechnology (Why? What? Applications, Properties)
- 10.00 to 11.00 am – Ways of synthesizing nano scale material (Top-down and bottom-up approach) – Video Illustration
- 11.00 to 12.00 pm - Characterization Technique (HRSEM, HRTEM, XRD)

Afternoon Session:

- 01.00 to 02.00 pm - Characterization Technique (FTIR, TGA, Bio-characterizations)
- 02.00 to 03.00 pm – Hands-on-training on ImageJ to analyse HRSEM and HRTEM data.
- 03.00 to 04.00 pm – Hands-on-training on Origin to analyse other characterization data.

Requirements:

1. A desktop or laptop computer is required. Windows 10 is recommended.
2. Stable internet connection
3. A microphone is strongly recommended for trainer communication.

BENEFITS: Certificates will be provided to Participants

CONTACT DETAILS:

CONTACT: 9840728806 / 09940322437.
MAIL: admin@topengineersindia.com.
WEBSITE: https://www.topengineersindia.com.

PYTHON PROGRAMMING WORKSHOP

Event Type: Hybrid Mode
Start Date: 24 June 2023
Last Date to Register: 22 June 2023
Location: Chennai.
Organizer: Top Engineers & MIT – Anna University.
Registration Fees: INR 999/-
Internship Duration: 1 day

Topics:

- INTRODUCTION TO ANACONDA, JUPYTER NOTEBOOK
- VARIABLES AND DATA TYPES
- PYTHON OPERATORS
- LIST, TUPLE, DICTIONARY & SETS
- CONDITIONAL STATEMENTS
- LOOPS IN PYTHON
- CLASS & FUNCTIONS
- PROJECT

Requirements:

1. A desktop or laptop computer is required. Windows 10 is recommended.
2. Stable internet connection
3. A microphone is strongly recommended for trainer communication.

BENEFITS: Certificates will be provided to Participants

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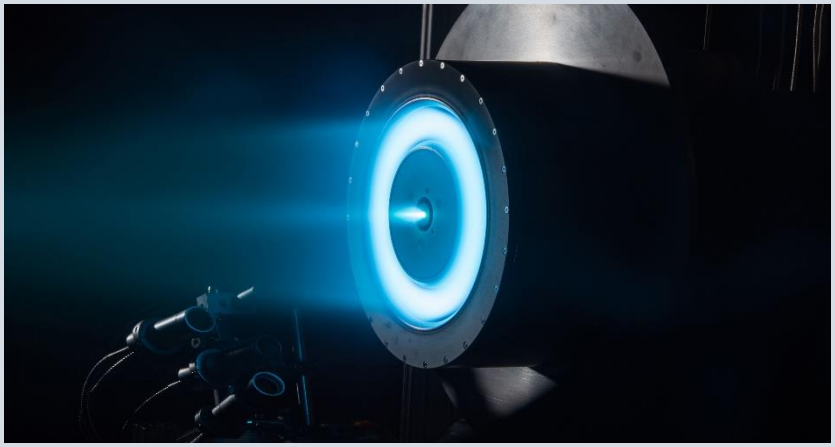
ELECTRIC PROPULSION

R.J. YUHENDRAN
21BME103
2nd Year Mechanical

Electric Propulsion (EP) is a class of space propulsion which makes use of electrical power to accelerate a propellant by different possible electrical and/or magnetic means. The use of electrical power enhances the propulsive performances of the EP thrusters compared with conventional chemical thrusters.

Electric propulsion systems utilize electrical energy to propel spacecraft or aircraft. They work on the principle of accelerating ions or charged particles and expelling them at high velocities to generate thrust. Different types of electric propulsion systems, such as ion thrusters, Hall effect thrusters, and plasma engines, employ variations of this principle to achieve efficient propulsion with higher specific impulse and lower fuel consumption compared to traditional chemical rockets.



Components of Electric Propulsion: An Electric Propulsion System is composed by four different building blocks: The thruster components, the propellant components or fluidic management system, the power components, and the pointing mechanisms.

Types of Electronic Propulsion Systems: There are various types of electronic propulsion systems, each with its unique characteristics:

a) Ion Thrusters: Ion thrusters ionize a propellant, typically xenon gas, and accelerate the resulting ions using electric fields. They are known for their high specific impulse and low thrust, making them suitable for deep space missions and station-keeping.

b) Hall Effect Thrusters: Hall effect thrusters use a magnetic field to accelerate ions, providing moderate thrust levels and high efficiency. They are commonly used for geostationary satellite propulsion.

c) Plasma Thrusters: Plasma thrusters utilize electromagnetic fields to ionize and accelerate propellant gases, offering a balance between thrust and efficiency. They are being developed for various space exploration missions.

d) Electrodynamic Tethers: Electrodynamic tethers utilize a conductive tether that interacts with a planet's magnetic field to generate thrust. They have the potential to enable low-cost orbital transfers and deorbiting.

Potential Applications:

Electronic propulsion has a wide range of potential applications in space travel:

a) Deep Space Missions: Electronic propulsion systems are ideal for long-duration missions to outer planets and beyond, as they provide efficient propulsion and extended operational lifetimes.

b) Station-Keeping and Orbit Adjustments: Electronic propulsion is well-suited for maintaining the position and orbit of satellites, reducing the need for large amounts of propellant.

c) Orbital Maneuvers: Electronic propulsion systems can enable precise orbital adjustments, allowing spacecraft to rendezvous with other satellites, perform complex formations, and conduct scientific experiments.

d) CubeSats and Small Satellites: The miniaturization of electronic propulsion systems is making them viable for small satellites, providing propulsion capabilities for orbital manoeuvres and deorbiting.

Electric propulsion is currently considered by all space actors as a key and revolutionary technology for the new generations of commercial and scientific satellites. With its potential applications ranging from deep space missions to satellite operations, electronic propulsion holds the key to unlocking new possibilities in space exploration. As technology continues to advance, electronic propulsion systems will play an increasingly significant role in shaping the future of space travel, making our journeys through the cosmos more efficient, sustainable, and far-reaching.

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):

PO1 : An ability to independently carry out research /investigation and development work to solve practical problems.

PO2 : An ability to write and present a substantial technical report/document.

PO3 : 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.

PO4 : Apply knowledge and competencies in manufacturing, analytics, supply chain, quality and engineering management.

PO5 : Apply principles of industrial engineering to solve problems in industry.

PO6 : An ability to work as part of interdisciplinary teams, communicate effectively, model and design engineering systems optimally.