





Department of Mechanical Engineering



Editors: Dr. C. Velmurugan Mr. B. N. Sreeharan Associate Editors: Mr. P. Kapil Anandh Mr. B. Praveen

# PROPOSALS SUBMITTED

 Dr. V. Manivel Muralidaran, AP (II) and Dr. A. P. Arun, AP (II) submitted a proposal for Rs. 10,37,500 to SERB on "Experimental investigation of adding oxide particles in improving cold crack resistance of High Strength Low Alloy steel 950A".

# **ONLINE FDP/ WEBINARS ATTENDED**

- Dr. C. Velmurugan, Professor & Head, attended One week FDP on "Finite Element Method" conducted by CHITKARA University, Punjab Campus from 20.04.2020 to 24.04.2020.
- Dr. V. Muthukumaran, Professor, attended Patent Search and Analytics Webinar on 24.04.2020 and KNOW HOW SOLIDWORKS Simulation can improve product quality & reliability Webinar on 13.04.2020.
- Dr. R. Manivel, Professor attended Webinars on "eProtect respiratory infections(EN), Route of Solar Energy organized by WHO and ENERGY AGENCY respectively on 20.04.2020.
- Dr. N. Sangeetha, Sr Asso Professor attended two programs, viz. One Week FDP and online training program on Finite Element Method and on examination reform conducted by CHITKARA University, Punjab Campus and by AICTE, Delhi between 20.04.2020. and 25.04.2020.

- Dr. K. M. Senthilkumar, Associate Professor attended one week FDP on E-content development in education sector, organized by Dr. NGP Institute of Technology between 20.04.2020 and 24.04.2020.
- Dr. V. R. Muruganantham, Associate Professor attended a Webinar and a 12 weeks online FDP on "E respiratory systems, organized by WHO and NPTEL - Direct online, direct examination and certification on 04.04.2020. Further he attended the following programmes:
  - Webinar: IPR & Software 29.04.2020
  - Webinar: Strength of Materials 28.04.2020
- Dr. M. Balaji, Associate Professor attended Webinars on "eProtect respiratory infections (EN) and Severe Acute Respiratory Infection (SARI) Treatment Facility Design" on 15.04.2020. In addition to above, he attended the following programmes:
  - Competency-Based Learning: Introduction 17.04.2020
  - Severe Acute Respiratory Infection (SARI) Treatment Facility Design – 20.04.2020
  - Work Smarter, Not Harder: Time Management for Personal & Professional Productivity – 20.04.2020
  - Market Research and Consumer Behavior 22.04.2020 and 23.04.2020

- Dr. S. Balasubramanian, Associate Professor attended following programmes.
  - 1. Webinar CII Online Training session on Design for Additive Manufacturing with Optimization and Digital Manufacturing process - PELF INFOTECH – 09.04.2020
  - Webinar Series Severe Acute Respiratory Infection (SARI) Treatment Facility Design – WHO – 04.04.2020
  - 3. Webinar Series Patent Search and Analytics - TURNIP Corporation - 24.04.2020
  - India Sweden Innovation Accelerator Webinar on Innovative Clean Technologies -Surfcleaner AB – 03.04.2020
  - 5. Webinar Markforged 3D printing materials -Pelf Infotech - 28.04.2020
  - 6. Webinar National Innovation and Startup Policy for Students and Faculty 2019 – 28.04.2020
  - 7. FDP TLC and Virtual Teaching CIT 29.04.2020 and 30.04.2020
- Dr B. Senthilkumar, Associate Professor attended a Webinar - Master CAM and an Online Training Program on Newer Techniques in Mastercam for Turning and Milling. He also attended a Two Day Virtual Learning Workshop on Design, Deliver and develop online courses through Moodle Platform, organized by MasterCAM and Coimbatore Institute of Technology on 24.04.2020, and during 20.04.2020 and 21.04.2020".
- Mr. P. R. Ayyappan, Assistant Professor (SRG) attended WHO sponsored Webinar on e-PROTECT Respiratory Infections (EN) on 04.04.2020.

- Dr. S. Thirumurugaveerakumar, Associate Professor attended Online Training programs on Severe Acute Respiratory Infection (SARI) Treatment Facility Design and Patent Search and Analytics conducted by WHO and by TUNIP Corporation on 06.04.2020 and on 26.04.2020. He also attended the following programmes:
  - Online ePROTECT Respiratory Infections (EN)
    WHO Course 15.04.2020
  - Online- Infection Prevention and Control (IPC) for Novel Corona Virus (COVID - 19) -WHO Course - 03.04.2020
  - MHRD e-session on National Innovation and Startup Policy for Students and Faculty 2019
     A Guiding Framework for HEIs for Implementation – 28.04.2020
  - MHRD e-session on Role and Importance of Pre-Incubators, Incubators and Accelerators in HEIs – 29.04.2020
  - MHRD e-session on Hangout with Emerging Innovator & Entrepreneurs Supported through MIC & AICTE – 30.04.2020
- Mr. T. Karuppusamy completed an Online course on ePROTECT Respiratory Infections (EN) – WHO on 15.04.2020.
- Dr. V. Manivel Muralidaran, Assistant Professor II attended Online Course on Intelligent Machining, Online Course on Digital Manufacturing Design, Two Days FDP on Virtual Teaching, Three days FDP on Design of Experiments organized by Coursera, CIT, JAER on 02/04/2020, 09.04.2020, 20.04.2020 and on 25.04.2020 respectively.

- Dr. K. Ulaganathan, Assistant Professor III, attended Webinar series, Online Training Session, Online FDP and a Webinar series on e-PROTECT Respiratory Infections (EN), Design for Additive Manufacturing with Optimization and Digital Manufacturing Process, FDP on Virtual Teaching, Patent Search and Analytics organized by WHO, PELF INFOTECH, Pune, TLC, CIT, Coimbatore and by Turnip Innovations on 27.03.2020, 09.04.2020, 20.04.2020, 25.04.2020, 27.03.2020 respectively. Following the above, he also attended the following programmes:
  - Training Program on Laboratory Management as per ISO / IEC 17025: 2017 for Testing and Calibration Laboratories – 27.04.2020 & 28.04.2020
  - MHRD e-session on National Innovation and Startup Policy for Students and Faculty 2019 -A Guiding Framework for HEIs for Implementation – 28.04.2020
  - MHRD e-session on Role and Importance of Pre-Incubators, Incubators and Accelerators in HEIs – 29.04.2020
  - MHRD e-session on Hangout with Emerging Innovator & Entrepreneurs Supported through MIC & AICTE – 30.04.2020
- Mr. P. Pradeep, Assistant Professor, attended a Webinar on Learn how SOLIDWORKS Simulation can improve product quality and reliability!, organized by Dassault Systèmes India Private Limited" on 13.04.2020.

- Dr. K. K. Arun, Assistant Professor III attended a one FDP on FEM, organized by CHITKARA University, Punjab Campus from 20.04.2020.
   Further he participated in the following
  - Webinar Series 1: Current trends in Web Apps - 23.04.2020
  - Webinar Series 2: Image Cryptography 24.04.2020
  - Webinar Series 3: Robotics & Automation 27.04.2020
  - Webinar Series 4: AI and ML Tools for healthcare – 28.04.2020
  - Webinar Series 5: Implications of e-learning in traditional learning – 29.04.2020
  - Advanced manufacturing Process Analysis 16.04.2020
  - Digital Manufacturing @Design 16.04.2020
  - Introduction to CAD, CAM and Practical CNC – 19.04.2020
- Mr. M. A. Vinayaga Moorthi, Assistant Professor II attended following Online Training / Webinar, Design for Additive Manufacturing with Optimization and Digital Manufacturing process, Severe Acute Respiratory Infection (SARI) Treatment Facility Design organised by PELF INFOTECH, WHO on 09.04.2020 and 02.04.2020 respectively. Further he attended a couple of programmes as detailed below:
  - MHRD IIC WEBINAR Session 1: National Innovation and Startup Policy for Students and Faculty 2019 – 28.04.2020
  - FDP TLC&CIT Virtual Teaching 29.04.2020 and 30.04.2020.

- Mr. S. Sivakumar, Assistant Professor II, attended One week FDP on Finite Element Method, organized by CHITKARA University, Punjab Campus from 20.04.2020 to 24.04.2020. He also attended the following programmes:
  - Online- Infection Prevention and Control (IPC) for Novel Corona Virus (COVID - 19) - WHO Course - 03.04.2020
  - Webinar : Electric Solar Vehicle Project 17.04.2020 to 19.04.2020.
  - MHRD e-session on National Innovation and Startup Policy for Students and Faculty 2019 -A Guiding Framework for HEIs for Implementation – 28.04.2020
  - MHRD e-session on Role and Importance of Pre-Incubators, Incubators and Accelerators in HEIs – 29.04.2020
  - MHRD e-session on Hangout with Emerging Innovator & Entrepreneurs Supported through MIC & AICTE – 30.04.2020
  - MHRD e-session on Role of Network Enablers in driving I&E in HEIs - A Case of TiE, India – 01.05.2020
- Mr. K. Krishnamoorthi, Assistant Professor II attended a Webinar on "Transform Cities with Microsoft IoT Solutions, organized by MICROSOFT on 21.04.2020.
- Mr. S. Ramanathan, Assistant Professor II, attended following programmes: One week FDP on Finite Element Method, eProtect respiratory infections(EN) organized by CHITKARA University, Punjab Campus and by WHO on 20.04.2020 and on 24.04.2020.

- Mr. M. Thirumalaimuthukumaran, Assistant Professor II attended following programs:
  - Online course on "ePROTECT Respiratory Infections (EN), Covid-19 awareness" on 28-03-2020.
  - Webinar on COVID-19. WHO Webinar Series on Severe Acute Respiratory Infection (SARI) Treatment Facility Design on 04-04-2020.
  - One week FDP on Finite Element Methods for Beginners during 20-04-2020 to 24-04-2020 organized by Chitkara University.
  - Webinar on Patent Search and Analytics by TURNIP Corporation on 24-04-2020
  - Webinar on Financial management during crisis by Career Zone on 24-04-2020
  - Webinar on "Managing Stress and Emotional & Mental Well-Being during the COVID-19 Crisis for Educators" on 27-04-2020
  - Webinar on Developing thinking abilities relevant for engineering education on 28-04-2020.
  - Webinar on Session 1: National Innovation and Startup Policy for Students and Faculty 2019 on 28-04-2020.
  - Webinar on Importance of communication in a borderless economy on 28-04-2020.
  - One day workshop on Book publishing, Article publishing and content platform demonstration on 29-04-2020.
  - Webinar on 'To Guide Students to Select Meaningful Engineering Projects' on 30-04-2020 organized by Dassualt Systems, La Foundation India.
  - Webinar on Online teaching essentials, by British council on 30-04-2020.

- Mr. S. Rajesh, Assistant Professor attended a Webinar on Transform Cities with Microsoft IoT Solutions, organized by MICROSOFT on 21.04.2020.
- Dr. A. P. Arun, Assistant Professor II, attended Webinar on "Transform Cities with Microsoft IoT Solutions" organized by MICROSOFT on 21.04.2020. Further, he attended the following programmes:
  - FDP on Latex conducted by Vallalar college 27.04.2020
  - Online Two day faculty development program on virtual teaching – CIT – 28.04.2020 and 29.04.2020
  - Online Quiz "Covid-19 pandemic awareness" 26.04.2020
  - National Innovation and Startup Policy for Students and Faculty – 28.04.2020
  - Role and Importance of Pre-Incubators, Incubators and Accelerators – 29.04.2020
  - Received excellent performance certificate on IPR day online quiz conducted by Karpagam institute of technology – 27.04.2020
- Mr. V. R. Navaneeth, Assistant Professor, attended a FDP on FEM, organized by CHITKARA University, Punjab Campus on 20.04.2020.
- Dr. S. Balaji, Assistant Professor attended a Two days webinar Awareness Training Program on General Requirements for The Competence of Testing and Calibration Laboratories as Per – ISO/IEC 17025:2017 Institute of Quality, Confederation of Indian Industry between 27.04.2020 and 28.04.2020. He also attended Online ePROTECT Respiratory Infections (EN) -WHO Course on 15.04.2020.

- Mr. B. Jeeva, Assistant Professor attended One week FDP, Webinar and Online training on "Finite Element Method", "e-PROTECT Respiratory (EN)", "Design for Additive Infections Manufacturing with Optimization and Digital Manufacturing process" organized by CHITKARA University, Punjab Campus and PTU, Punjab, WHO. and PELF Infotech on 20.04.2020. 24.04.2020 respectively.
- Mr. B. N. Sreeharan, Assistant Professor II attended following programmes: Webinar on Save Costs by Moving Non-Linear Physics Load cases to Altair OptiStruct, Managing Stress and Emotional & Mental Well-Being during the COVID-19 Crisis for Educators organized by Altair and VET Institute of Arts and Science, Erode on 22.04.2020 and 27.04.2020 respectively. He further attended following programmes
  - Webinar on "Emerging Trends in Industry Automation" 30.04.2020
  - Webinar on "To Guide Students to Select Meaningful Engineering Projects". – 30.04.2020
  - Webinar on "The Value of Data Analytics in the Smart Factory" – 24.04.2020
  - Online Quiz "Covid-19 pandemic awareness" – 29.04.2020
- Mr. M. Ramesh Kumar, Asst. Professor attended a two days webinar on "Electric Vehicle solar project" between 17.03.2020 and 18.03.2020 organized by ISINE.

- Mr. P. D. Devan, Assistant Professor attended following programmes One week FDP, Webinar – I, Webinar – II, 12 weeks online FDP, 8 weeks online FDP on Finite Element Method, Patent Search and Analytics, e-PROTECT Respiratory Infections (EN), NATE, Operations Research organized by CHITKARA University, Punjab Campus, Turnip Innovation, WHO and NPTEL on 20.04.2020, 24.04.2020, 03.04.2020. Further he also participated in the following events.
  - Fundamentals of Strength of Materials-Webinar – 27.04.2020
  - World Intellectual Property Day Quiz 26.04.2020
  - National Innovation & Startup Policy (NISP)-Webinar – 28.04.2020
  - Pre-incubation and Incubation Management-Webinar – 29.04.2020
  - Hangout with Emerging Innovator & Entrepreneurs Supported through MIC & AICTE- Webinar – 30.04.2020
  - Webinar 'To Guide Students to Select Meaningful Engineering Projects' – 30.04.2020
  - Ek Bharat Shrestha Bharat Quiz 28.04.2020
- Mr. P. Prashanth, Assistant Professor, attended a Webinar on Learn how SOLIDWORKS Simulation can improve product quality and reliability! Organized by Dassault Systèmes India Private Limited on 13.04.2020.
- Mr. K. Manikanda Prasath, Assistant Professor, Webinar on "Save Costs by Moving Non-Linear Physics Loadcases to Altair OptiStruct" organized by Altair on 22.04.2020.

- Mr. R. S. Mohankumar, Assistant Professor, attended Online Training program on Coursera on 3D printing revolution from 13.4.2020 to 27.4.2020. He also attended the following programmes:
  - Fundamentals of Strength of Materials-Webinar – 27.04.2020
  - World Intellectual Property Day Quiz 26.04.2020
  - National Innovation & Startup Policy (NISP)-Webinar – 28.04.2020
  - Pre-incubation and Incubation Management-Webinar – 29.04.2020
  - Hangout with Emerging Innovator & Entrepreneurs Supported through MIC & AICTE- Webinar – 30.04.2020

### **ALUMNI VISIT**

Distinguished Alumni Mr. Vigneshbabu (2013 Passed out batch), Assistant Manager, Quality, L&T visited the department.

### **GUEST LECTURES DELIVERED**

Dr. R. Manivel, Professor, delivered a lecture to PGDDE VI Batch Trainees on 29.4.2020 on "Description and Design of Jumpers used in Oil and Gas Industry".

Dr. S. Bhaskar, Associate Professor, delivered a lecture to KCT Students through YouTube on 24.04.2020 on LOCF - Learning Outcomes Based Curriculum Frame work and Cover letter preparation as part of OBE Training.

# PAPER PUBLICATIONS

- Dr. Samuel Ratna Kumar P S, Assistant Professor, published a paper titled "Influence of CNT-based Nanocomposites in Dynamic Performance of Redundant Articulated Robot in the Journal Robotica.
- Dr. Arun K K, Assistant Professor III published a paper titled "Fuzzy rule-based environment-aware autonomous mobile robots for actuated touring" in the journal 'Intelligent Service Robotics'
- Mr. S. Sivakumar, Assistant Professor II published a paper titled "Effect of nano cupric oxide coating on the forced convection performance of a mixed mode flat plate solar dryer" in the journal 'Renewable Energy'.
- Dr. C. Velmurugan, Professor published a paper titled "Effect of nano cupric oxide coating on the forced convection performance of a mixed mode flat plate solar dryer" in the journal 'Renewable Energy'.

In addition to above papers, 19 papers were submitted for publication.

### **ONLINE COURSES COMPLETED – A STAT**

 Our department faculty members totally registered for 101 courses and completed 68 courses and other courses are being progressed. Some of the details are:

# Dr. Balasubramanian. S

- 3D Printing revolution
- Digital Manufacturing and Design
- Inspection and Quality Control in Manufacturing

#### Dr. P. S. Samuel Ratna Kumar

- Welcome to the Game theory
- Material science

#### Mr. P. D. Devan

- Sig Sigma Define and Measure Phase
- Sig Sigma Analyze Tool
- Introduction to Basic Vibration
- Data Analytics for Lean Six Sigma

### Mr. Sreeharan B N

- Excel Skills for Business: Essentials
- Excel Skills for Business: Intermediate I
- Excel Skills for Business: Intermediate II
- Excel Skills for Business: Advanced

# Mr. A P Arun

- Nanotechnology: A Maker's Course
- Molecular Spectroscopy
- Material Behavior

# Mr. M. A. Vinayagamoorthi

- 3D Printing revolution
- Digital Manufacturing and Design
- Inspection and Quality Control in Manufacturing

# Dr. K. Ulaganathan

- Mechanics of Materials: I
- Mechanics of Materials: II
- Mechanics of Materials: III
- Mechanics of Materials: IV
- Digital Manufacturing and Design
- Introduction to Sustainability

## Dr. S. Balaji

- Accounting: Principles of Financial Accounting
- Micro economic principles.

### Mr. S. Suresh

- Mechanics of Materials
- Introduction to Thermodynamics

### Mr. T. Karuppusamy

Material Behaviour

# Mr. S. Sivakumar

- Introduction to Solar cells
- Introduction to Buddhism and Psychology

### Dr. C. Velmurugan

• Fundamentals of Fuel Power Systems

## Dr. S. Thirumurugaveerakumar

- Material Behavior
- Inspection and Quality Control in Manufacturing

# Dr. P. Sathyabalan

Introduction to Engineering Mechanics

# Dr. S. Bhaskar

• Presentation Skills

# Dr. V. R. Muruganantham

- Intelligent Machining
- Safety in Utility
- Industry 4.0
- NATE (Waiting for Exam)
- Engineering Project Management (In Progress)

## Dr. B. Senthilkumar

- Neural Networks and Deep Learning
- Initiating and Planning Projects

# Dr. S. Sivakumar

- Mechanics of Material I
- Mechanics of Material IV
- Wind Energy
- Introduction to Battery Management Systems

# Dr. K. K. Arun

• Digital Manufacturing and Design

# Mr. P. R. Ayyappan

- Fundamentals of Engineering Exam
- Mind Control

# Dr. V. Muthukumaran

- Digital Manufacturing and Design
- Al for everyone

# Dr. V. Manivel Muralidaran

- Intelligent Machining
- Advanced Manufacturing Process Analysis

# Mr. K. Krishnamoorthi

Nanotechnology: A Maker's Course

# Mr. S. Rajesh

- Mechanics of Materials I
- Introduction to Thermodynamics
- Mechanics of Materials IV

# Mr. R. S. Mohankumar

- The 3D Printing Revolution
- Inspection and Quality Control in Manufacturing

## Mr. B. Jeeva

• Introduction to Thermodynamics: Transferring Energy from Here to There.

### Mr. P. Pradeep

- Mechanics of Materials I
- Introduction to Thermodynamics
- Mechanics of Materials IV

# Mr. P. D. Devan

 Orientation towards Technical and Curriculum Aspect

# Mr. P. Prashanth

- Technology Enable Learning and Life Long Self Learning
- Introduction to Basic Vibrations

# Mr. K. Manikanda Prasath

- Orientation towards Technical and Curriculum Aspect
- Visual Analytics with Tableau
- Fundamentals of Visualization with Tableau
- Essential Design Principles on Tableau

# Mr. S. Suresh

- Orientation towards Technical and Curriculum Aspect
- Mechanics of Materials
- Introduction to Thermodynamics

Our students totally registered for 621 courses and among which 390 courses were completed and other courses are being pursued.

# **STUDENTS' ACTIVITIES**

# PRODUCT DEVELOPED



Mr. Boopathi Karthik (18BME202) under the guidance of Mr. M. A. Vinayagamoorthi, AP II designed and developed an automatic wall-mounted sanitizer system to prevent the coronavirus spread from one person to another person, which is about to get patented.

 Another product based on UVC Light Conveyor For Disinfecting Corona Virus On Edibles is under development by the department.

### **MECHANICAL ENGINEERING ASSOCIATION**

During COVID-'19 lockdown period, following events were organized by our Mechanical Engineering Association. Events are coordinated by Dr. V. R. Muruganantham, Associate Professor.

- 35 students competed in Mech\_Master conducted on 10.04.2020. Mr. Gowtham S (17BME109) won the first place and Ms. Nandhini (18BME068) secured the second place.
- 30 students participated in Alumni Talk A Webinar under MEConnect Placement talk series – 1 on 18.04.2020.
- 26 students competed in CAD Challenge conducted on 24.04.2020. Mr. Avinash Roshan V R V (18BME045) and Mr. Suriya (18BME230) won the first and second place, respectively.
- A total of 292 students participated in Mech Bee Insta quiz context on 02.04.2020 and 08.04.2020.

# **OTHER EXTRA CURRICULAR ACTIVITIES**

 Mr. Siddharth, Mr. Rishi Vignesh, Mr. Mugunth subash, Mr. Kishore and Mr. Akash loganathan of department on behalf of MUSIC CLUB performed QUARANTUNES (Home Jam) on 17.03.2020. They also involved in Insta live jam on 05.04.2020



# **STUDENT ACHIEVEMENTS**

Following team got selected to the 2<sup>nd</sup> round of National Level Competition SIH 2020 in the hardware project titled "Way out for man-animal conflict, especially for protection of agriculture crops from wild animals".

	Name	Roll. No
Team Leader	Shrinithi V	17BEC078
Team Member	Harshapradha.M	1 17BEC118
Team Member	Kabilan TM	17BME172
Team Member	Priyadharshini R	17BIT030
Team Member	Sharan Raj S	17BIT060
Team Member	Maharaja M	17BMC005



### **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.

- 5. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 6. 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.
- 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.