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Department of Mechanical Engineering
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Sustainable Engineering & Green Mechanical Technologies

What it is:

As the world faces growing environmental challenges, mechanical engineers are stepping into a new era — one where innovation must also mean **sustainability**. The future of engineering is not just about performance and efficiency, but about designing systems that **protect the planet**. This shift toward *green mechanical technologies* is shaping how industries design, manufacture, and operate their machines and systems.

Examples: lightweight structures in vehicles, efficient thermal systems (HVAC), renewable-energy mechanical systems.

What is Sustainable Engineering?

Sustainable engineering is the **application of engineering principles** to design systems that use energy and materials responsibly, with minimal impact on the environment.

In simple terms, it's about creating solutions that **meet today's needs without compromising future generations**.

It focuses on:

- ✚ **Energy efficiency:** Reducing power consumption in mechanical systems.
- ✚ **Eco-friendly materials:** Using recyclable, biodegradable, or low-impact materials.
- ✚ **Waste minimization:** Designing for reuse, repair, and recycling.
- ✚ **Cleaner manufacturing:** Adopting low-emission processes and renewable energy sources.

Why it matters:

Mechanical engineers have always been problem-solvers, but now the biggest problem is *sustainability*. The integration of green technologies can:

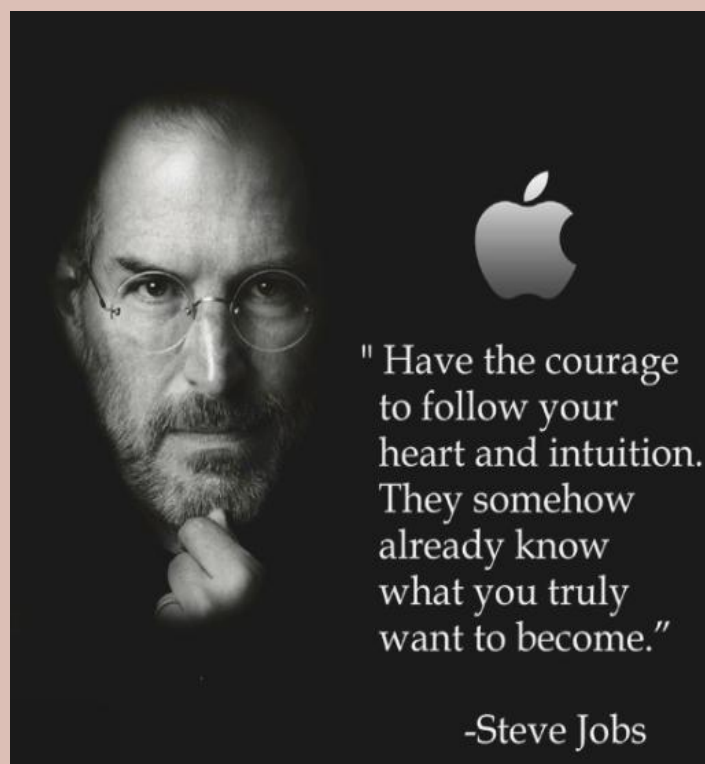
- ✚ Reduce greenhouse gas emissions
- ✚ Cut industrial waste and pollution
- ✚ Save costs through energy optimization
- ✚ Ensure long-term environmental balance

Closing Thought:

The journey toward a sustainable future depends on engineers who design with both innovation and conscience. By merging advanced mechanical technologies with environmental responsibility, we can create a future where progress and the planet grow together — hand in hand.

Research Projects in Progress from Govt. Bodies

- AICTE project of Prof. V. Chittaranjan Das, and Dr. K. Praveen Kumar on 'Synthesis and Characterization of MWCNT/UHMWPE Nanocomposites for Orthopedic Applications' is in progress.
- A DST-AMT project of Dr. K. Sobha and Dr. S. Radhika on 'Wound Dressing Material Containing Copper Coated Cotton Fabrics and Piezoelectric Electrospun Biopolymer Nano-Fibrous Composites' is in progress.



Industrial Research Projects in Progress

- Research project on 'Mechanical and Electrical Behaviour of Boron & Vanadium Doped Fe-6.5 (Wt. %) Si Soft Magnetic Alloy Ribbons Fabricated by Direct Powder Rolling' of K. Ravindra, V. Chittaranjan Das, K. Praveen Kumar is in progress.
- Research project on 'Improvement of COP of air-conditioning systems by using different types of insulations and nano-compressor oil' of N.V.V.S. Sudheer, B. Ramgopal Reddy, V. Tarachand, and Md. Hasheer is in progress.
- Research project on 'Investigation on performance improvement methods of the transformer using nanofluids in the perspective of cooling' of G. Srinivasarao, C. Srinivas, K. Balaprasad, N. Govind, and Sneha. H. Dhoria is in progress.
- Research project on 'Evaluation and optimization of process parameters for agitation in concrete mixing' of C. Tarasanka, S. Radhika, and J. P. Karthik is in progress.

- Research project on 'Development and characterization of boron & vanadium doped Fe-6.5 (Wt. %) soft magnetic alloy ribbons with TiO₂ coatings' by K. Srinivas, D. V. V. Krishnaprasad, G. Chaitanya, V. Ramakoteswararao, J. Rangaraya Chowdary is in progress.
- Research project on 'Influence of heat treatment on the characterization of alumina reinforced AZ91 Mg alloy metal matrix composites' of Ch. Devaraj, M. Vijaya, A. Muddu, G. Kishore Chowdary, and K. Hari Prasad is in progress.
- Research project on 'Optimization of selective laser melting (SLM) process parameters using Taguchi and super ranking concepts to produce Ti-6Al-4V alloy samples' of R. Sreenivasulu, D. Swapna, K. L. Chaitanya, D. Kondalarao, Y. N. V. Sairam, T. N. S. Ramakrishna is in progress.

Patents filed/Published/Granted

- S. Raviteja, S. S. Raghuram, Dharmendra Kumar, B. Shailendra Kumar, P. Suresh Kumar, 'A Novel Gas Circulation System Operating With Alternative Fuel in Vehicles. Application No: 1215639, Innovation, Science and Economic Development Canada, Canadian Intellectual Property Office, 17, July, 2024.
- J. Anita Lett, S. Anandhi, Suvvari C V Ramana Murthy Naidu, N. Rajiv Kumar, P. Suresh Kumar, Dharmendra Kumar, 'Vibration Reducing Flywheel.', Application No: 6379776, UK Design, 31, July, 2024.
- Sekar K Resna S R, M. Chitra, Archana R. Kocharekar, K. Sathesh Kumar, P. Suresh Kumar, R. Azhagumurugan, 'A Novel Method for Nanofabrication of Nanoparticles in Solar Cells for Enhanced Solar Energy Absorption.', Application No. 202441058871, 09, Aug. 2024.
- Jaya prakesh Venugopal, M. S. Pachupuri, B. M. Raj, A. Satish kumar, P. Vijay P. Suresh Kumar, S. Siva Chandran, 'Performance Analysis Method For Lubricant Oils Using Reichert Test To Evaluate Extreme Pressure (EP) Properties of Lubrication and Cutting Fluids', Application No. 202441061974 A, 23, Aug. 2024.
- R. Vigneswaran, P. Dhivakar, T. Venkatmuni, Dharmendra Kumar, P. Suresh Kumar, A. Sam Immanuel, S. Mathvel, 'Novel Heated Chamber System for Performance Analysis of Charge Values in IC Engines', Application No. 202441075401 A, 18 Oct. 2024.
- K. Prasad, P. Dhivakar, R. Ranjit Kumar, U. Pradeep Kumar, T. V. Harshen, P. Suresh Kumar, 'A Method for Efficient Commercialization of Metal-Based Composites in Industrial Applications', Application No. 202441075402 A, 18 Oct. 2024.

- Ashwin Sailish, V. Vinod Kumar, K. Narayanmoorthy, T. Venkatmuni, J. Denish Kumar, P. Suresh Kumar, A. Rajendra prasad, 'An Alternative Fuel Assisted Control System for Internal Combustion Engine and Method Thereof', Application No. 202441082999 A, 8 Nov. 2024.
- Satyanarayana Tirlangi, Chetan Jaiswal, Inamul Hasan, Bharathi, 'Light Connecting Rod for Better IC Engine Efficiency', Design No. 6358130, Certificate of Registration for a UK Design, 2 Dec. 2024.

Text Book Published

- A. Rajendra Prasad, C. Sailaja, V. Dinesh Kumar, P. Suresh Kumar, 'Elements of Mechanical Engineering', Scientific International Publishing House, ISBN: 9789357577830.
- V. Ramesh, Md. Sajid, P. Suresh Kumar and K. Arun K, 'Fluid Mechanics and Machinery', Scientific International Publishing House, ISBN-978-93-6132-124-5.

Seminars/ Events Organized

- MechMantra-2024 was organized by the Department of Mechanical Engineering which took place with 411 participants on Dec. 28, 2024.

Guest Lecture Delivered

- Radhika, 'Accelerators/Incubation - Opportunities for Students & Faculties - Early-Stage Entrepreneurs', at BV Raju Institute of Technology, 8 Aug. 2024.

Awards

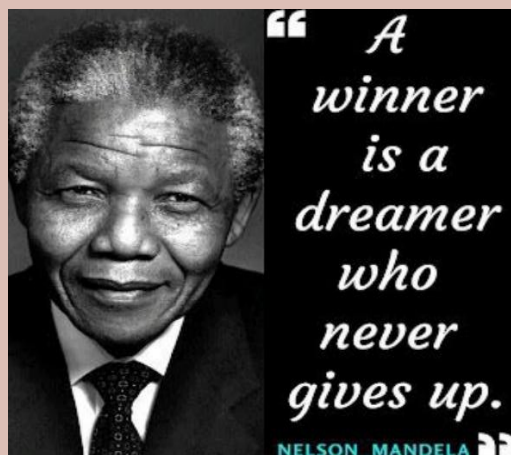
- P.Suresh Kumar, Best Researcher Award, National Research Excellence Awards 2024-25, Innovative Research & Education Academy - 2024- 2025- Tamil Nadu, Ministry of MSME, Govt. of India.

Research Paper Publications

- Kota, S., Dumpala, P., Sajja, R. et al., 'Investigation of functional characteristics of copper/copper oxide nanoparticles synthesized with *Moringa oleifera* and *Musa* sps. extracts: in-vitro and porcine study,' *Sci Rep*, Vol. 14, Article 30857, 2024. <https://doi.org/10.1038/s41598-024-81169-5>(SCI)
- T. Sathish, P. Suresh Kumar, S. D. Uma Mageswari, N. Stalin, R. Pandian, Jayant Giri, M. Atif, Chander Prakash, and Mohammad Yusuf, 'Carbonization and Gasification of Cow-Dung and Fe₃O₄ Nanoparticles at Different Operating Conditions for Hydrogen Production,'

ChemistrySelect, Vol. 9, Article e202402515, Sep.2024. doi.org/10.1002/slct.202402515.(SCI)

- Ashok Kumar Koshariya, Sujit Kumar, Megha Kulkarni, P. Madhu, P. Suresh Kumar, Vinh Dinh Nguyen, Saud Alarifi, Anis Ahamed, Soon Woong Chang, Balasubramani Ravindran, 'Effect of Acidic Treatment for Conventional Processing and Recent Advances on Lignocellulosic *Ricinus Communis*. A Comparative Evaluation on Decomposition of Biomass for Environmental Sustainability,' *Waste and Biomass Valorization*, July, 2024. <https://doi.org/10.1007/s12649-024-02591-4> (SCI)
- Salava V Satyanarayana, P. Suresh Kumar, 'Prediction of Liquid Insulating Material Failure Using Machine Learning Algorithms', *Journal of Electrical Systems*, Vol. 20-3, pp. 7861-7870, Dec. 2024. (Scopus)
- Mallapuram Bala Chennaiah, K. Ravi Kumar, Reddy Sreenivasulu, Tarunika Sharma, A. Somaiah, M. Naga Phani Sastry, Pankaj Kumar, 'Thermal Properties of *Oreochromis* Fish Scale Powder-Reinforced Composites for Sustainable Engineering Applications,' *Innovation and Emerging Technologies*, Vol. 11, pp. 2440014-1 to 2440014-7, 2024 DOI: 10.1142/S2737599424400140 (*Web of Science*)
- D.Swapna, D.Sameer Kumar, B.Sateesh, S.Radhika, Ch.Srinivasa Rao, 'A Comprehensive Validation of GRA with Ant Colony Optimization for Robust Optimal Design: A Case Study on the Forming Process,' *Proceedings of the Institution of Mechanical Engineers, Part E: Journal of Process Mechanical Engineering*, ISSN 0954-4089, Oct. 2024.(SCI)
- K.L.Chaitanya, K.Srinivas, Sneha.H.Dhoria, M.Vijaya, D. Sameer Kumar, 'Optimization of Wear Behaviour and Friction of LM26 Composite under Dry Sliding conditions,' *International Journal on Interactive Design and Manufacturing*, 2024, pp. 1-18.(WOS)



Book Chapters Published

- Richa Khare, P.Suresh Kumar, A. Chinnasamy, R.Hemalatha, G.Shashibhushan, B.Sampath, 'Energy case cascade conversion system and Energy efficient infrastructure: Experimentation, Results, and Discussion and Case studies', DoI:10.4018/979-8-3693-0492-1.CH006 IGI GLOBAL- publisher.

NPTEL Certification Courses Completed

- Y.N.V Sairam, NPTEL Online Certification (4 week) course, 'Python for Data Science' IIT Madras, July- Dec 2024.
- Y.N.V Sairam NPTEL Online Certification (12 week) course during July- Dec.2024, on 'Introduction to machine learning' conducted by IIT Madras.
- V.Ramakoteswara Rao, J.P.Karthik, A.Muddu, 12-week FDP, 'Introduction to Internet of Things', July – Oct. 2024.

AICTE PG Certification Programs

- V.Ramakoteswara Rao, J.P.Karthik, and A.Muddu, AICTE PG certification programme, 'Wireless and IOT', IIT Rourkela, July-Dec.2024.
- K.Praveen Kumar, 'Machine learning', IISc Bangalore, July-Dec.2024
- Sneha.H.Dhoria AICTE PG certification programme on 'Artificial Intelligence and Machine learning', IIIT Nagpur, July- Dec.2024.
- Ch.Devaraj, AICTE PG certification programme on 'Artificial Intelligence and Data Science', IIIT Kottayam, July- Dec.2024.
- K.Hari Prasad, AICTE PG certification programme on 'Block chain and Data Science', IIT Patna.

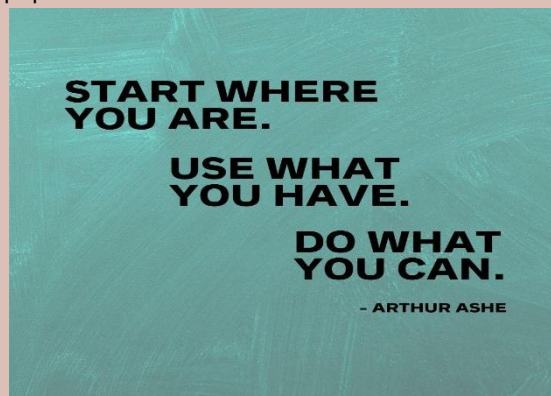
Workshops/FDP's Attended

- C.TaraSasanka, K.L.Chaitanya, M.Vijaya, J.Rangaraya Chowdary, J.P.Karthik, Sneha.H.Dhoria, and A.Muddu, One Week online FDP on 'Innovations in Robotics and UAVs: Digital Twins, Drone Design, and Future Trends' Dept. of ME, VNR VJiet, 30 July - 03 Aug. 2024.
- Md.Hasheer D.Kondala Rao, two-week online FDP, 'Advances in Mechanical Engineering', Dept. of ME, PVPSIT, 2-13, Dec. 2024.
- Md.Hasheer, D. Kondala Rao, Y.N.V.Sairam, ATAL Academy FDP, 'Emerging Green Hydrogen Energy Technologies for Societal Sustainability and Climate Change Mitigation', LBRC College of Engineering, 16-21, Dec. 2024.
- P. Suresh Kumar, five-day ATAL FDP, 'AI & ML Empowerment in Energy Storage and Advanced Robotics', Aditya Engineering College, 9-14, Dec. 2024.

- J.P.Karthik, 'Advancements in Metal forming Technology: Innovations, Future Scope and Challenges', Dept. of ME, O.P.Jindal University, Raigarh, 2-6, Dec.2024.
- Reddy Sreenivasulu, five day FDP, 'Sustainability and Research in Modern Mechanical Engineering', Dept. of ME, Madanapalle Institute of Technology & Science, 23 – 27, Sep. 2024.
- C.Tara Sasanka, One Week Online FDP on 'Innovations in Robotics and UAVs: Digital Twins, Drone Design, and Future Trends', VNR VJiet 30 July - 03 Aug. 2024.

Ph.D Awarded Under Faculty Guidance

- Under the guidance of Dr.C.Tarasasanka, Associate Professor, RVRJCCE, Ph.D degree was awarded for Y.N.V Sairam in the month of July, 2024 from Annamalai University, Chidambaram with title of the thesis as 'Experimental Investigation and Characterization of Lanthanum Hexa-Aluminate Reinforced AZ91E Magnesium Alloy Composites'.
- Under the guidance of Dr.C.Tarasasanka, Associate Professor, RVRJCCE, Ph.D degree was awarded for J.Purushottam Karthik in the month of Feb, 2025 from Annamalai University, Chidambaram with title of the thesis as 'Optimization and Evaluation of Overall Heat Transfer Coefficient and pH value of Coal Water Slurry with Different Impellers using Agitation Vessel Equipment'.



Industrial Tour

- The III/IV B.Tech (A & B Sections) students visited Kusalava International Ltd, Adavinekkalam and GS Alloys, Surampally on 23, 26 July, 2024.
- The II/IV B.Tech (A & B Sections) students visited Sri Lakshmi Ganapathi Engineering Works, Tenali and Sangam Diary, Vadlamudi on 23, 27 Aug. 2024.
- The IV/IV B.Tech (A & B Sections) students visited Dr.NTPS, Kondapally on 21, Aug. and 5 Nov. 2024.
- The IV/IV B.Tech (A & B Sections) students visited Nagarjuna Cements, Kondapally on 6 Nov. 2024.