

A Report on
the 3rd International 5-Day Faculty Development Programme on
“Sustainability and Research in Modern Mechanical Engineering”
Organized by
Department of Mechanical Engineering
from 02.06.2025 to 06.06.2025.

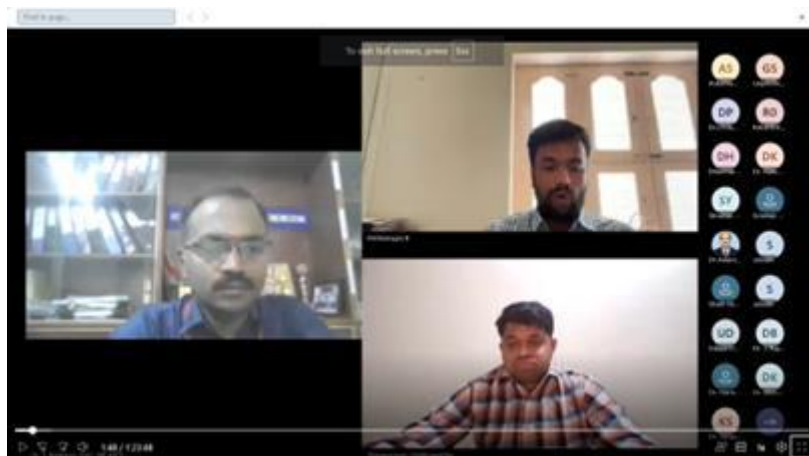


Figure 1. Inauguration Ceremony

Event Coordinators: Dr. R. Prithivirajan, Associate Professor, Dr. Anantha Raman L. and Dr. Gejendhiran S., Assistant Professor, Department of Mechanical Engineering.

Resource Person Details: Dr. Vijayarvarman Chakkravarthy – Cranfield University, UK; Dr. Papiya Bhowmik – Linnaeus University, Sweden; Dr. Manoj Kumar R. – VIT, Chennai, India; Ms. Refilwe Jenifer Kunatu – Richards Bay Minerals, South Africa; Dr. Kadir Gok – İzmir Bakırçay University, Turkey; Dr. Sivasakthivel Thangavel – Global College of Engineering and Technology, Oman; Dr. Vennapusa Jagadeeswara Reddy – Nanyang Technological University, Singapore; Dr. Shiva S. – Indian Institute of Technology, Jammu, India; Dr. Manoj Kumar Singh – King Mongkut's University of Technology, Thailand; Dr. Subbarama Kousik Suraparaju – Universiti Malaysia Pahang

Mode of Conduct: Online

Report Received on 24.06.2025.

The Department of Mechanical Engineering at Madanapalle Institute of Technology & Science (MITS) successfully organized the 3rd International Faculty Development Programme (FDP) on “Sustainability and Research in Modern Mechanical Engineering” from June 2 to June 6, 2025. The event aimed to enrich faculty members and researchers with knowledge of global engineering trends aligned with sustainability.

The FDP was coordinated by Dr. R. Prithivirajan, Associate Professor, with support from Co-coordinators Dr. Anantha Raman L. and Dr. Gejendhiran S., Assistant Professors from the Mechanical Engineering Department. Their meticulous planning ensured the smooth conduct of the sessions and the active engagement of all participants.

Inauguration Ceremony

The inaugural session was held on June 2, 2025, at 10:00 AM through an online platform. The ceremony began with a welcome address by Dr. S. Baskaran, Head of the Department of Mechanical Engineering, who highlighted the importance of sustainability and global collaborations in engineering education. The keynote address was delivered by Dr. Vijayarvarman Chakkravarthy, the opening day's distinguished speaker from Cranfield University, UK. Dr. R. Prithivirajan, Coordinator, introduced the FDP objectives and the line-up of international speakers. A total of 276 participants were registered and actively participated in the program. The inauguration concluded with a vote of thanks, acknowledging the management, organizing committee, and participants from various institutions worldwide.

Sessions Overview:

Day 1: 02.06.2025

Session I: Dr. Vijayavarman Chakkravarthy – Cranfield University, UK

Dr. Chakkravarthy delivered a lecture on "Post-Processing of Additive Manufactured Components." He highlighted key post-processing techniques such as heat treatment and surface finishing. Challenges related to dimensional accuracy, residual stress, and microstructure refinement were discussed. Emphasis was placed on improving the mechanical and functional properties of AM parts. The session offered practical insights into enhancing the performance of printed components.

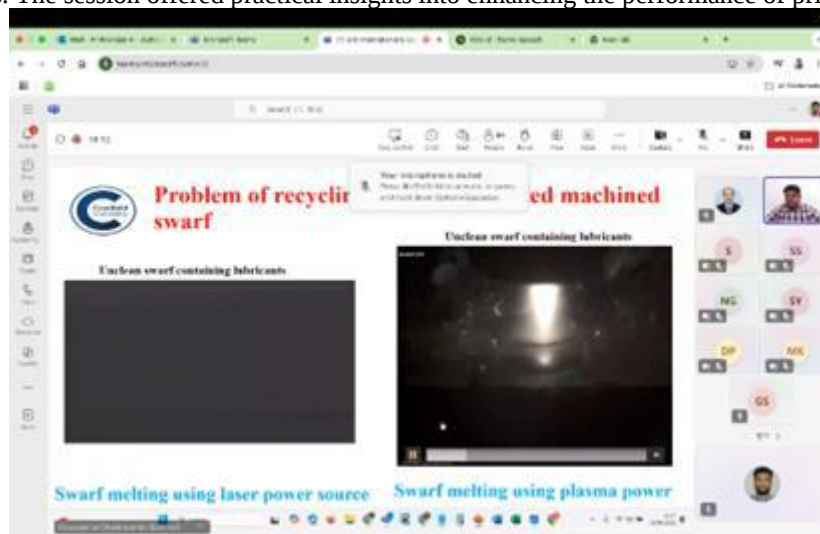


Figure 2. Session 1 handled by Dr. Vijayavarman Chakkravarthy

Session II: Dr. Papiya Bhowmik – Linnaeus University, Sweden

Dr. Bhowmik presented surface engineering for biomedical implants. She covered drug delivery systems and tissue integration using functional surfaces. Key research findings in implant coatings were showcased. Participants learned about the bio-compatibility improvements through engineering. The session bridged healthcare needs with material design.



Figure 3. Session II handled by Dr. Papiya Bhowmik

Day 2: 03.06.2025

Session I: Dr. Manoj Kumar R. – VIT, Chennai, India

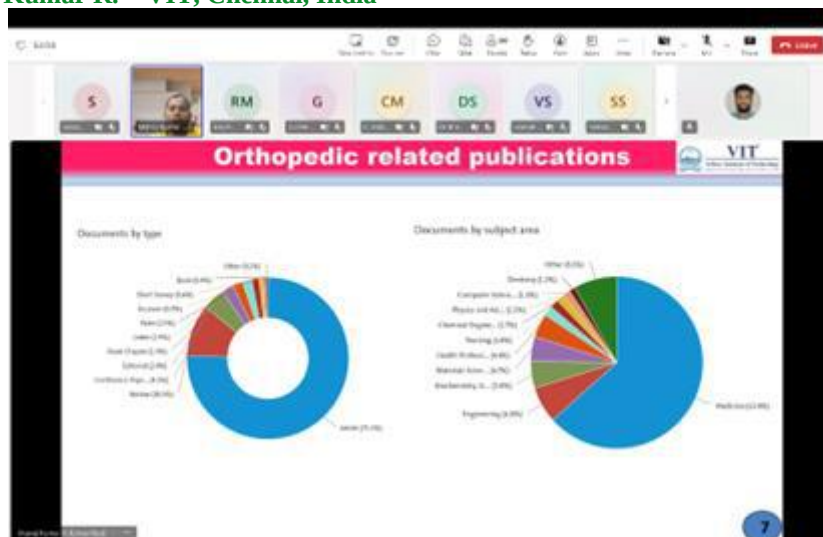


Figure 4. Session, I handled by Dr. Manoj Kumar R

He discussed innovations in non-conventional machining technologies. Abrasive jet and ultrasonic machining techniques were explained. He emphasized eco-friendly processes for hard-to-machine materials. Tool wear and energy consumption analysis were included. His talk encouraged innovation in sustainable manufacturing.

Session II: Ms. Refilwe Jenifer Kunatu – Richards Bay Minerals, South Africa

She presented on ilmenite-based simulation for titanium powder production. The session included resource modeling and extraction technology. Relevance to mineral industries and sustainability was emphasized. Simulations for process efficiency and output prediction were explained. Participants were introduced to critical mineral valorization strategies.

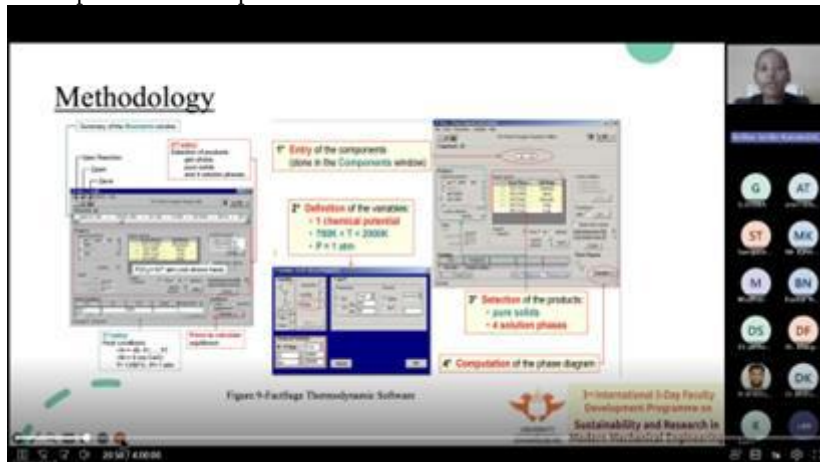


Figure 5. Session II handled by Ms. Refilwe Jenifer Kunatu

Day 3: 04.06.2025

Session I: Dr. Kadir Gok – İzmir Bakırçay University, Turkey

Dr. Gok presented on "Applications of Finite Element Analysis (FEA) in Engineering." He explained the role of FEA in simulating mechanical behavior under real-world conditions. Structural, thermal, and biomechanical case studies were demonstrated. The session emphasized how FEA aids in design optimization and failure prediction. Attendees appreciated the integration of simulation tools in mechanical engineering research.



Figure 6. Session, I handled by Dr. Kadir Gok

Session II: Dr. Sivasakthivel Thangavel – Global College of Engineering and Technology, Oman

He elaborated on energy efficiency and sustainability strategies in Oman's oil and gas sector. The session detailed current industrial challenges and potential green solutions. Insights into decarbonization technologies were discussed. Attendees appreciated the relevance of real-world industrial practices. The talk emphasized a systems approach for sustainable oil operations.

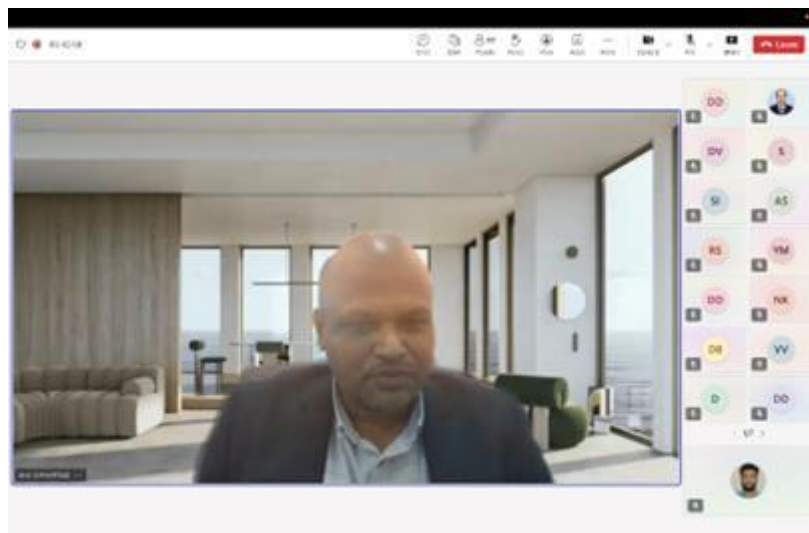


Figure 7. Session II handled by Dr. Sivasakthivel Thangavel

Day 4: 05.06.2025

Session I: Dr. Vennapusa Jagadeeswara Reddy – Nanyang Technological University, Singapore

Dr. Reddy presented on "Advanced Phase Change Materials for Industrial Applications." He explained the thermal storage capabilities and energy efficiency benefits of phase change materials (PCMs). Applications in sectors like HVAC, electronics cooling, and process industries were discussed. Emphasis was placed on material selection, performance criteria, and integration challenges. The session provided valuable insights into sustainable thermal management technologies.

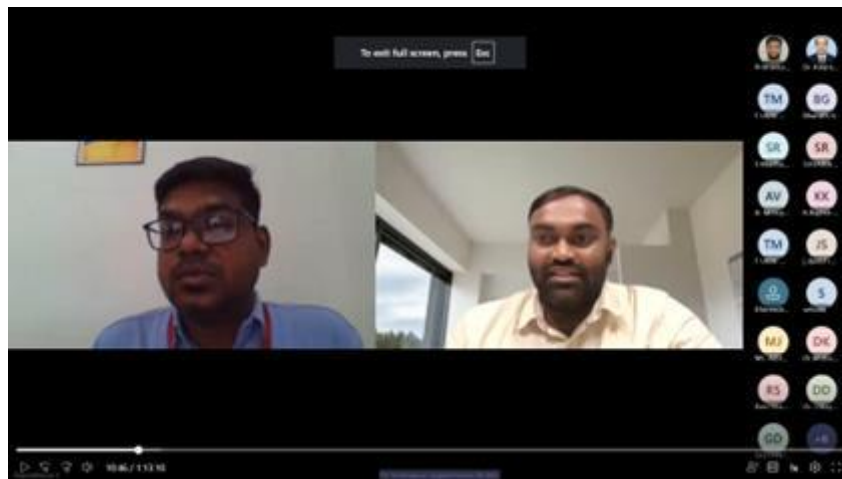


Figure 8. Session, I handled by Dr. Sivasakthivel Thangavel

Session II: Dr. Shiva S. – Indian Institute of Technology, Jammu, India

Dr. Shiva delivered a session on "Additive Manufacturing for Defence Applications." He explained the role of AM in producing lightweight, high-strength components for defense systems. Topics included rapid prototyping, customized parts, and battlefield logistics. Real-world examples from defense research projects were shared. The session demonstrated how AM enhances operational readiness and reduces lead times.



Figure 9. Session II handled by Dr. Shiva S

Day 5: 06.06.2025

Session I: Dr. Manoj Kumar Singh – King Mongkut's University of Technology, Thailand

Dr. Singh discussed "Advancements in Non-Conventional Machining Technologies." He introduced methods like EDM, ECM, ultrasonic machining, and their applications. The lecture focused on machining hard and complex materials with high

precision. He also highlighted recent innovations improving efficiency and sustainability. Participants gained insights into evolving trends in advanced manufacturing processes.



Figure 10. Session, I handled by Dr. Manoj Kumar Singh

Session II: Dr. Subbarama Kousik Suraparaju – Universiti Malaysia Pahang

Dr. Suraparaju delivered a talk on "Engineering Research Aligned with UN Sustainable Development Goals (SDGs)." He outlined how engineering innovations contribute to addressing global challenges such as clean energy, sustainable cities, and climate action. Case studies from various engineering domains were presented. He emphasized interdisciplinary collaboration for sustainable development. The session encouraged participants to align their research with global priorities.

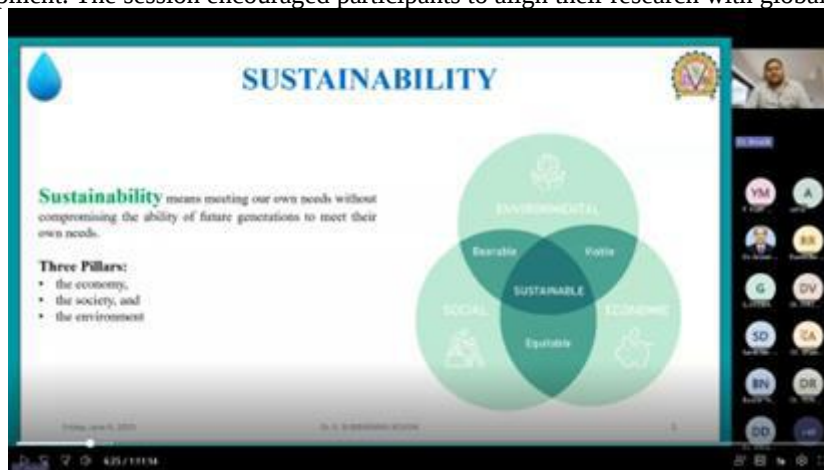


Figure 11. Session II handled by Dr. Manoj Kumar Singh

Valedictory Ceremony

The valedictory ceremony of the 3rd International FDP on “Sustainability and Research in Modern Mechanical Engineering” was held on June 6, 2025, marking the successful conclusion of the five-day event. The session was presided over by Dr. S. Baskaran, Head of the Department, who summarized the key highlights and knowledge shared throughout the program. Dr. R. Prithivirajan, Coordinator of the FDP, expressed heartfelt gratitude to all the distinguished speakers, participants, and organizing team for their enthusiastic involvement and cooperation. Several participants shared their feedback and appreciation for the quality of sessions and international exposure they received. The event concluded with closing remarks, followed by the distribution of digital certificates to all registered participants.