



# MECHANICAL ENGINEERING Bulletin

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DEPARTMENT OF MECHANICAL ENGINEERING  
**BIRLA INSTITUTE OF TECHNOLOGY MESRA**  
Ranchi, Jharkhand - 835215

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# Preface

Greetings to Esteemed Colleagues, Students, Alumni, Friends, and Well-wishers,

It is with great pleasure that we present the inaugural issue of the e-Newsletter of the Department of Mechanical Engineering, Birla Institute of Technology, Mesra. This initiative marks a significant step toward strengthening communication and fostering a sense of community among our faculty, researchers, students, alumni, and well-wishers.

The newsletter was envisioned by our Honourable Vice-Chancellor, Prof. Indranil Manna, a distinguished academician of international repute, as a platform to highlight achievements, share insights, and showcase the academic and research activities that define our department. This issue features research highlights, faculty profiles, student accomplishments, and upcoming events.

Rooted in interdisciplinary collaboration and academic excellence, the Department of Mechanical Engineering continues to evolve as a vibrant academic ecosystem. This newsletter offers a glimpse into our collective efforts and serves as a medium for engagement and exchange.

We sincerely thank all contributors for their dedication in bringing this initiative to life. We invite our readers to explore this issue and join us in celebrating the dynamic intellectual community of our department.

Warm regards,

Editorial Board,

e-Newsletter,

Department of Mechanical Engineering,

Birla Institute of Technology, Mesra.

# Editorial Team



**Dr. Lakhbir Singh Brar**

**Assistant Professor**

**Editor-in-Chief**



**Dr. Rajeev Kumar**

**Associate Professor**

**Editor**



**Dr. Sujeet Kumar Mishra**

**Assistant Professor**

**Editor**



**Dr. Ankur Chattopadhyay**

**Assistant Professor**

**Editor**

# From the Desk of HOD



**Dr. Apurba Kumar Roy**

**Associate Professor and Head**

Since its establishment in 1955, the Department of Mechanical Engineering has built a strong reputation for excellence in teaching and research. The department has consistently earned top grades from independent and government accreditation agencies in recognition of its academic standards and research contributions. State-of-the-art laboratory facilities, modern computing resources, a well-structured curriculum, and a dedicated team of faculty members together create a vibrant and intellectually stimulating learning environment. Graduates of Mechanical Engineering from BIT Mesra are highly sought after by leading national and multinational organizations, supported by an effective campus career development and placement centre.

Looking ahead, the Department of Mechanical Engineering is poised to make significant advances in academics and research, in alignment with the National Education Policy (NEP) 2020 and the evolving demands of Industry 4.0. The curriculum is being enriched with advanced courses in robotics, AI-enabled design, renewable energy systems, combustion engines, automobiles, and advanced thermal engineering. Research activities are focused on sustainable technologies, smart materials, fluid–structure interactions, and the application of AI/ML in mechanical systems. To support these initiatives, major infrastructure upgrades are in progress, including the enhancement of robotics and automation laboratories with industrial-grade platforms and the modernization of thermal and fluid laboratories with advanced instrumentation. These initiatives aim to foster interdisciplinary learning, strengthen industry collaboration, and promote innovation-driven research.

# Message from Alumni



**Dr. (Er.) J.P. Roy,**

**General Manager,**

**Talcher Thermal Power Project (NTPC)**

**B.Tech Batch: 1983-1987**

Dear Students,

Warm greetings to all of you!

It gives me immense pride and joy to connect with you as an alumnus of this esteemed institution, where I had the privilege of pursuing my B.E., M.E. and Ph.D. in Mechanical Engineering. These years were not just about academic learning, they were the foundation of who I am today, both professionally and personally.

Mechanical Engineering is often referred to as the “mother of all engineering branches”—and rightly so. It forms the backbone of innovation, design and manufacturing, touching every aspect of our modern world—from automobiles and aerospace to energy systems and robotics. It’s a discipline that not only builds machines but also fuels critical thinking, problem-solving and creativity.

This college has been more than just an educational institution for me; it has been a launchpad. With great faculty, a strong focus on research and innovation, good lab facilities, and an environment that promotes interdisciplinary learning, the institution truly excels in every aspect. It gave me a competitive space to grow, challenged me to step out of my comfort zone and continuously pushed me to become a better version of myself. It helped me discover and nurture my inner spark. Whether through academic projects, technical competitions, mentoring or simple corridor conversations, this college always created space for passion and purpose to flourish.

As someone who has walked the same corridors and sat in the same classrooms, I encourage you to embrace every opportunity that comes your way. Stay curious, focused and most importantly, stay true to your passion.

Wishing you all the very best in your journey ahead. Stay motivated, believe in your abilities, and continue to shine—in college and in life!

# About the Department

Since its inception in 1955, the Department of Mechanical Engineering has a wide reputation for the quality of teaching and research it offers. It has been awarded top grades for both teaching and research activities from independent and government bodies. The excellent laboratory facilities, modern computer clusters, systematically designed curriculum, and dedicated faculty members make this Department a dynamic place to study. Mechanical Engineering Graduates from BIT Mesra are sought after by many prestigious companies. There is also an excellent careers center on campus, which helps the students to get entry into multinational companies.

## Department vision

The Mechanical Engineering Department of Birla Institute of Technology, Mesra, Ranchi, strives to be globally recognized for quality engineering education and research, leading to well-qualified engineers, academicians and researchers who are innovative, entrepreneurial, and successful in achieving excellence in their field of study.

## Department mission

- ✓ To impart quality education to the students and enhance their knowledge and skills to be globally competitive Mechanical Engineers.
- ✓ To maintain state-of-the-art research facilities to enable its students and faculty to create, interpret, apply, and disseminate knowledge with an understanding of the limitations.
- ✓ To develop linkages and interaction with industry, R&D organizations, and educational institutions for excellence in consultancy practices, research, and teaching.
- ✓ To provide a conducive environment for learning, creativity, and problem-solving skills.

# About the Department

## Programme Educational Objectives (PEOs)

- ✓ To provide a quality undergraduate education for students entering the mechanical engineering profession who seek careers in related fields.
- ✓ To advance scientific knowledge through basic and applied research through scholarly publication, conferences, and continuing education.
- ✓ To acquire knowledge of relevant technologies and multidisciplinary fields, including broad social, ethical, and environmental issues within which engineering is practiced.
- ✓ To develop a problem-solving approach using analytical abilities, effective communication skills and teamwork.
- ✓ To create awareness and understanding related to social issues, apart from developing a sense of commitment to the community and profession, with sincere involvement.

## Programme Specific Outcomes (PSOs)

- ✓ The student will be able to design mechanical systems in various fields and challenges, such as machine elements, thermal systems, manufacturing, and industrial and interdisciplinary fields like additive manufacturing, soft computing, to meet the demands of the day in industry as well as society.
- ✓ The student will be capable of starting their entrepreneurship, be employable and suitable for various fields like design, manufacturing, production industries, academic and industries, research, and development organisations in and outside the country.
- ✓ The student will be able to pursue advanced degrees in engineering, business or other professional fields through their knowledge and learnt skills through formal as well as informal self-study and motivation.

# Departmental Activities



Visit by Dr. Jeevan Vachan Tirkey, Department of Mechanical Engineering, IIT (BHU), on 22/4/2025.



Prof. Janak Shah, founding director of the Indian Institute of Management, Udaipur (IIM Udaipur), visited on 11/2/2025.

# Departmental Activities



L & T Officials in our Dept. on 07/08/2025.



Prof. Partho Pratim Majumdar, National Science Chair (Scientific Excellence), Government of India & Distinguished Professor, John C. Martin Centre for Liver Research & Innovations, visited on 13/07/2025.

# Departmental Activities



Dr. Om Prakash, NIT Patna, visited our Department on 6<sup>th</sup> May, 2025.



Expert Talk by Dr. Om Prakash, "Introduction to Concentrated Solar Power (CSP) and Thermal Energy Storage" at Jawahar Navodaya Vidyalaya, Village-BIT Mesra, PO-BIT Mesra, Ranchi, Jharkhand 835215 on 07/10/2024.

# Departmental Activities



Expert Talk on Waste Management Technologies by Dr. P. Shanmugam, Chief Scientist, CSIR, CLRI-Chennai on 22.01.2025.



The 1980 mechanical batch passed out, visited on 14 December 2025.

# Departmental Activities



Prof. Prasanta Kumar Mahato, Dept of Mechanical Engineering, IIT(ISM) Dhanbad, visited our Dept on 12/12/2025.



Dr. Sanjay Kumar, Scientist G, Armament Research & Development Establishment (ARDE), DRDO) 1989-1992 BIT Mech. Eng. batch on 01/12/2015.

# Departmental Activities



With Mr. Sanjeev Kr. Choudhary, 1983-1987 Mech. Eng., BIT Mesra. Executive Director and State Head, IOCL, visited on 28/11/2025.



With Mr. Sujit Bose (1979-1983), Mech. Eng. (in middle), on 3/9/2025. He worked in ONGC.

# Departmental Activities



With Mr. Kushagra Sharan (BE/1005/2010), Asst. Prof., IIM Ranchi on the left and Mr. Rohit Mehta (BE/1024/2010) - Gothenburg, Sweden, Simulation and Modeling Engineer at VOLVO cars, visited on 26/7/2025.

# Departmental Activities



SSR Programme held at BIT Mesra on 20/08/2025, during which students of Guru Nanak School visited the institute and gained knowledge on cyclone separators.



SSR Programme held at BIT Mesra on 29/08/2025, during which students of DAV Bariatu visited the institute and gained knowledge related to the FRICTION STIR WELDING process.

# New Equipment Purchased (H.T. Lab)



Free and Forced Convection Apparatus

# New Equipment Purchased (H.T. Lab)



Heat Transfer in Pin Fin Apparatus

# Awards and Achievements



Dr. Lakhbir Singh Brar (on the left) and Dr. Om Prakash (on the right) have been recognized in Stanford University-Elsevier World's top 2% Scientists List, 2025.



Dr. Lakhbir Singh Brar received the Faculty Appreciation Award (BITFAA'25) for his distinguished contributions in Sponsored Research

# Awards and Achievements



Dr. Kaushik Kumar as Chief Guest and Keynote Speaker during 1st International Conference on Applied Artificial Intelligence and Machine Learning (ICAAIML-2024), 30th–31st August, 2024, Vignan institute of Technology and Science, Hyderabad, INDIA

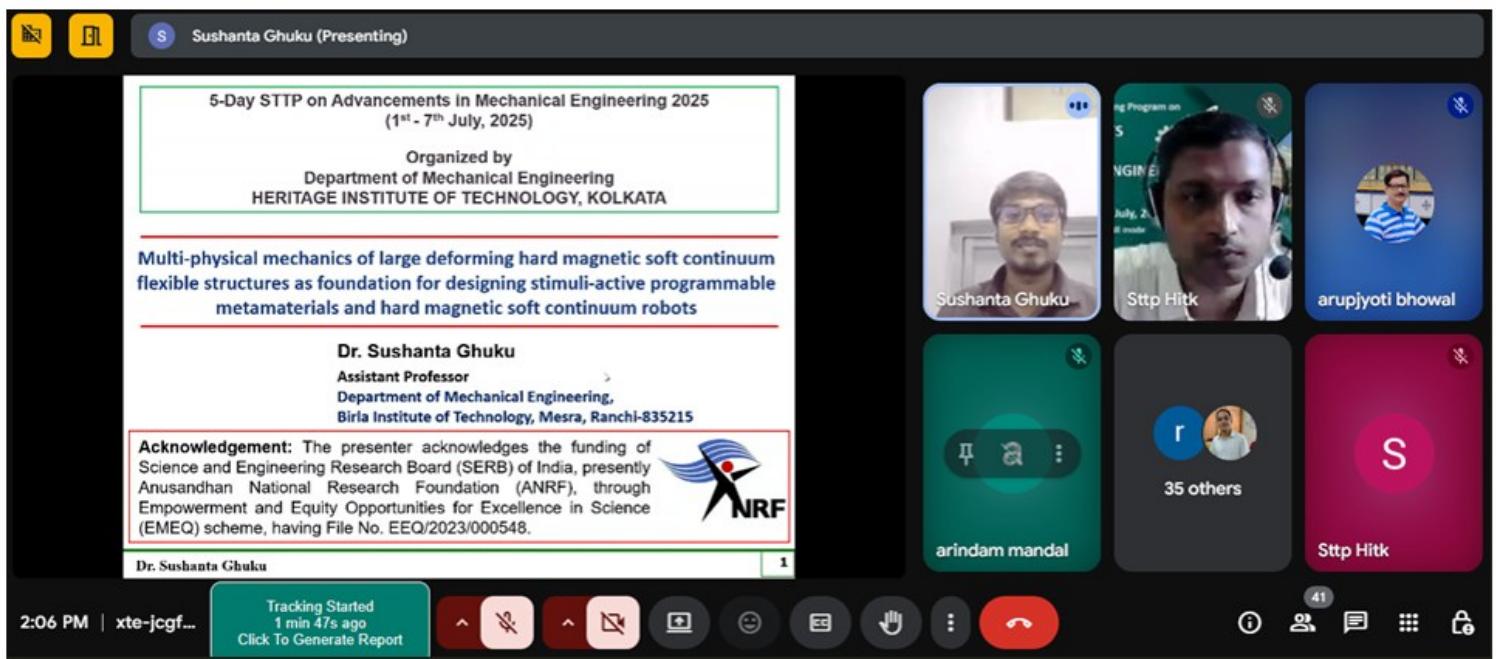


Dr. Kaushik Kumar as a resource person for SVU Faculty Lecture Series, 24th December 2024 at Swami Vivekananda University, Kolkata.

# Awards and Achievements

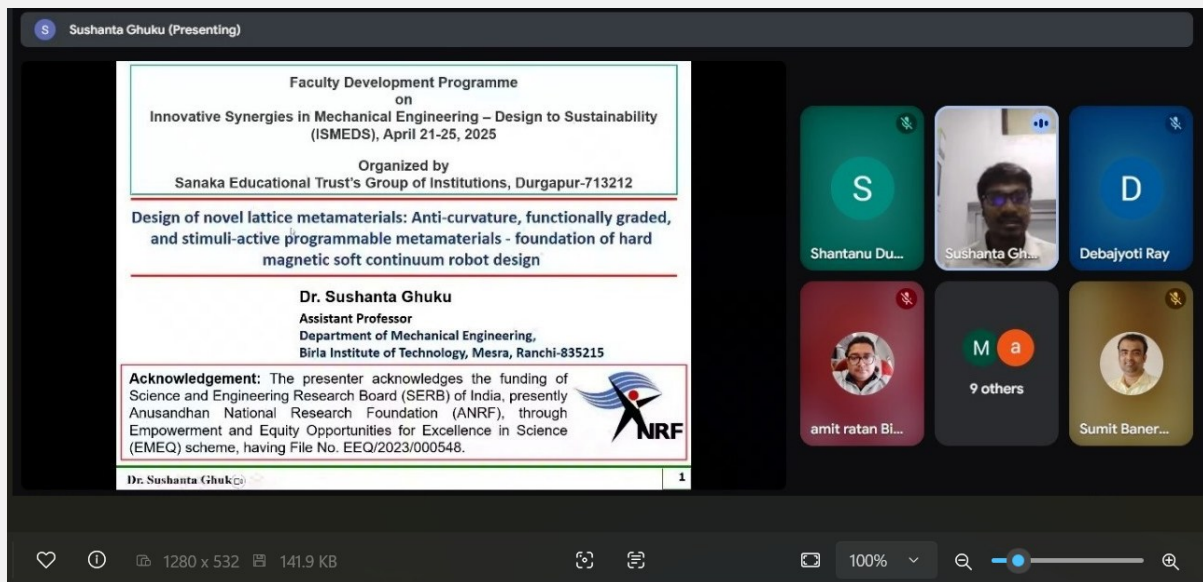


Dr. Kaushik Kumar as Chief Guest and Keynote Speaker during 3rd International Conference on Engineering Design and Computing (ICEDC-25), 4th – 6th February, 2025, Swami Vivekananda University, Kolkata, INDIA



Dr. Sushanta Ghuku delivering invited lecture (online) on the topic “Multi-physical mechanics of large deforming hard magnetic soft continuum flexible structures as foundation for designing stimuli-active programmable metamaterials and hard magnetic soft continuum robots” in the 5 Day STTP on Advancements in Mechanical Engineering, July 1-7, 2025, Organized by Department of Mechanical Engineering, Heritage Institute of Technology, Kolkata.

# Awards and Achievements



Dr. Sushanta Ghuku delivering invited lecture (online) on the topic “Design of novel lattice metamaterials: Anti-curvature, functionally graded, and stimuli-active programmable metamaterials - foundation of hard magnetic soft continuum robot design” in the Faculty Development Programme on Innovative Synergies in Mechanical Engineering – Design to Sustainability (ISMEDS), April 21-25, 2025, Organized by Sanaka Educational Trust’s Group of Institutions, Durgapur-713212.



Guest Speaker at the JCSTI-sponsored high-end workshop organized by the Mechanical Engineering Department, NIT Jamshedpur, held from 13-17 January 2025.

# Projects, Consultancies and Patents

## New/Extended Projects

1. Development of Novel Home Artifacts from Cow dung and Waste Crop Stubble for Economic Activities in Rural Areas, Unnat Bharat Abhiyan, IIT Delhi, MoE, Govt. of India, Rs.1.00 Lakh, Date of Sanction: 26.07.2025 for six months. PI- *Dr. Richa Pandey* and Co-PI- *Dr. Rajeev Kumar*.
2. Conversion of Organic Waste to Bioenzyme, Unnat Bharat Abhiyan, IIT Delhi, MoE, Govt. of India, Rs.1.00 Lakh, Date of Sanction: 26.07.2025 for six months. PI- *Dr. Richa Pandey* and Co-PI- *Dr. Rajeev Kumar*.
3. Extension of DST Ongoing Project up to one year i.e. 29.09.2024 to 28.09.2025 Entitled “Development , Testing, Calibration and Validation of Stirling Engine for Decentralized Power Generation using Bio- Gas Produced from Stubble and Agricultural Waste” under Waste Management Technology, now Vigyan Dhara Scheme. Amount- Rs.93,25,863/-, PI- *Dr. Rajeev Kumar*, Co-Pi- *Dr. P. Shanmugam* CSIR-CLRI, Chennai.

## Ongoing Projects

1. Development of Ni reinforced Surface composite of AA5083 with high wear, tensile and fatigue resistance for modern transportation sector’ (2024-2027) SERB (Amount: 52.08 Lacs), *Dr. Arun Kumar Kadian*, *Dr. Arkadeb Mukhopadhyay*, *Dr. Dilip Kumar Singh*, *Dr. Anil Chandra Mahato*.
2. Development of abrasion-resistant electroless Ni-B-W coating on cyclone separator walls and design optimization for longevity with enhanced performance. Funded by SERB for 03 years (2024 – 2027). Amount: 48.64 Lacs. *Dr. L.S. Brar*, *Dr. Arkadeb Mukhopadhyay*, and *Dr. Om Prakash*.

# Projects, Consultancies and Patents

## Ongoing Projects

3. Development of high angle of attack CFD aerodynamic database & behaviour model of missile configuration at varying geometric and flow parameters. Funded by AR&DB, DRDO for 02 years (2024 – 2026). Amount: 39.8 Lacs. *Dr. Priyank Kumar, Dr. Sudip Das, and Dr. L.S. Brar.*
4. “Atmospheric plasma surface treatment and development of graphene-reinforced zinc-rich nanocomposite coatings on aircraft structure materials for superior corrosion and wear resistance” SERB CRG (2023-26), Amt. 34 Lakhs (INR). *Dr. Sanat Mukherjee, Dr. Rishi Sharma, Dr. S.K. Dhiman.*
5. “Nanofluids based solar heat harvesting through modified hybrid PV-TEG panel for sustained solar output and extended life span” SERB CRG (2024-27), Amt. 37.12 Lakhs (INR). *Dr. S.K. Dhiman, Dr. Sanat Mukherjee, Dr. Deepak Kumar, Dr. Anupam Roy.*

## Consultancies

1. Structural Design and Stability Validation of Mobile Trolley System mounted with 900 Watt Solar PV plates and 1 HP Surface Water Pump, for Royal Instruments Pvt. Ltd., 201, Modi Heights, Phase - 2, Ratu Road, Ranchi – 834001 (PI: *Dr. A. K. Roy*, Joint PI: *Dr. Arbind Kumar*).
2. Structural Design and Stability Validation of Trolley system mounted with 2 HP Solar Pump, for Directorate of Agriculture, Govt. of Jharkhand, Kanke Road, Ranchi- 834008 (PI: *Dr. A. K. Roy*, Joint PI: *Dr. Arbind Kumar*).

# Projects, Consultancies and Patents

## Consultancies

3. Mechanical Properties Testing of various structural Steel Rods, for Executive Engineer, Water Pipeline Division, Medaninagar (25/06/2025). (PI - Dr. Nirmal Kumar , Joint PI- Dr. Om Prakash)
4. Mechanical Properties Testing of various structural Steel Rods, for Country Head, Orrisa Steel and Power Pvt. Ltd., Jhargram (WB) (25/08/2025). (PI - Dr. Nirmal Kumar , Joint PI- Dr. Om Prakash)
5. Mechanical Properties Testing of various structural Steel Rods, for the Office of Assistant Divisional Engineer, East Central Railway, Barkakana, Ramgarh (30/10/2025). (PI - Dr. Nirmal Kumar , Joint PI- Dr. Om Prakash)

## Patents

1. A method for evaluating the uniformity of reinforcement distribution and detecting agglomeration in filler-reinforced composites, and system thereof, *Dr. Kaushik Kumar, Mr. Jeenendra Kumar Shiv, Dr. Sudeepan Jayapalan, Dr. Arkadeb Mukhopadhyay*, Indian Patent Application No. 202531008060 Dated 30.01.2025 Official Journal of The Patent Office; Issue 06/2025 Dated 07/02/2025 Page No. 14427).
2. *Rahul, Sujeet Kumar Mishra, Deepak Kumar, Pankaj Kumar Dubey, Vikash Kumar Gorain, Yash Raj Mishra*, Wall-Mounted Foldable and Ventilated Laptop Workstation, Design No. 453257-001 dated 27/03/2025, Published on 25.06.2025

# Journal Publications

1. Sharma R., Mishra D.P., Brar L.S., Neural Network-Guided Genetic Algorithm for Multi-Objective Optimization of Fin-and-Tube Heat Exchangers Incorporating Novel Curved Winglets, *Engineering Applications of Artificial Intelligence*, 165(A) (2026) 113349. [SCI/E]
2. Wasilewski M. and Brar L.S., Comparative evaluation of four-phase interaction models for solid-gas separation and flow dynamics in a square cyclone under high loading conditions, *Separation and Purification Technology*, 382(3) (2026): 135945. [SCI/E]
3. Borsuk G., Wydrych J., Wzorek M., Godek-Bucyk E., Brar L.S., End-of-Life Management of Creosote-Treated Railroad Ties for Energy Recovery in Cement Kiln Installation: A CFD Modelling Approach, *Waste and Biomass Valorization*, 16 (2025). [SCI/E]
4. Sharma R., Mishra D.P., Brar L.S., Data-Driven Optimization of Asymmetric Curved Winglets in Fin-and-Tube Heat Exchangers, *Swarm and Evolutionary Computation*, 97 (2025): 1–21. [SCI/E]
5. Kumar M., Om Prakash, Brar L.S., Analyzing the impact of inclined single and multi-inlet configurations on the turbulent flow field in cyclone separators using large-eddy simulation, *Separation and Purification Technology*, 376 (2025): 1–29. [SCI/E]
6. Kumar M., Saha I., Pandey S., Prakash O., Elsayed K., Brar L.S., Analysis and optimization of cyclone separators with bulged conical segments using large-eddy simulation and artificial neural network, *Separation and Purification Technology*, 370 (2025): 1–20. [SCI/E]
7. Om Prakash, Ahmad A., Nayan P., Brar L.S., Chatterjee R., Sharma S., Kumar A., Abbas M., Rajkumar S., Ramaswamy K. Thermal dispersion study of roof and wall materials with chemical pretreatments for energy reduction, *Int. J. of Chem. Reactor Eng.*, 23(3) (2025): 393-404. [SCI/E]
8. Safikhani H., Farahani S.D., Brar L.S., Esmaeili F., CFD-based optimization of dynamic cyclones with variable vortex length using GMDH artificial neural network, *Digital Chemical Engineering*, 15 (2025): 1–10. [SCI/E]

# Journal Publications

9. Ahmad A., Prakash Om, Brar L.S., Irshad K., Hasnain S.M.M., Paramasivam P., Ayanie A.G., Effect of Wall, Roof, and Window-to-Wall Ratio on the Cooling and Heating Load of a Building in India, *Energy Sc. & Eng.*, (2025): 1-25. [SCI/E]
10. Wasilewski M., Ligus G., Brar L.S., Investigations of the flow phenomena inside square cyclone separators with different prismatic heights, *Separation and Purification Technology*, 362(2) (2025): 131724. [SCI/E]
11. Sharma R., Mishra D.P., Chakraborty S., Prakash Om, Brar L.S., Multi-objective optimization of fin and tube heat exchanger with triple inclined straight winglets for performance enhancement, *Journal of Enhanced Heat Transfer*, 32(3) (2025): 61–87. [SCI/E]
12. Prakash Om, Pandey V.K., Kumar L., Brar L.S., Chakraborty S., Kumar A., Ahmad A., Computational and experimental analysis of thermal oil-based parabolic trough collector, *Journal of Enhanced Heat Transfer*, 32(3) (2025): 19–35. [SCI/E]
13. Ranjan Kumar, Sujeet Kumar Mishra, Sudeepan Jayapalan "Effect of Molybdenum disulfide (MoS<sub>2</sub>) reinforcement on the Structural, Thermal, Mechanical, and Tribological analysis of Novel Polyamide 6,6 (PA 6,6) Composites" *Journal of Applied Polymer Science* 142 Issue 26 (2025) pp 1-22
14. Ranjan Kumar, Kamalendra Vikram, Sudeepan J, Sujeet Kumar Mishra "Evolution of metallic dental implants: historical perspective, needs, and application (2025) Vol 22 pp 89-106 Ch 1.4, *Adv. Bio. Composites Materials, Design, Manufacturing*.
15. Ranjan Kumar, Sujeet Kumar Mishra, Sudeepan J "Tailoring the performance of Nano silica reinforced PA-6,6 nanocomposite: Insight into their structural, thermo-mechanical, tribological and scratch resistance behaviour" *Polymer Composites* (2025) pp 1-19
16. Om Prakash; Kumar, Lalan ; Ahmad, Asim ; Hasnain, S M Mozammil; irshad, kashif ; Giri, Jayant ; Paramasivam, Prabhu; Zairov, Rustem ; Dabelo, Leliso Hobicho "Experimental Validation of Numerical Simulation Model for No-Load Hybrid Greenhouse Solar Dryer. *Energy Science & Engineering*. Accepted.

# Journal Publications

17. Sujit Kumar, Asim Ahmad, Kashif Irshad, Om Prakash, Rukaiya Kausher, S M Mozammil Hasnain, Prabhu Paramasivam, Abinet Gosaye Ayanie, Jayant Giri. 2025. Energy-exergy and environmental-economic (4E) Analysis of Heat Storage- Based Single-Slope Solar Stills Integrated with Solar Air Heater. PLoS ONE 20(1): e0314036. <https://doi.org/10.1371/journal.pone.0314036> SCI
18. Om Prakash, Asim Ahmad, Pranav Nayan, L.S.Brar, Rajeshwari Chatterjee, Shubham Sharma, A. Kumar, M. Abbas, S. Rajkumar and K. Ramaswamy. Thermal Dispersion Study of Roof and Wall Materials with Chemical Pretreatment for Energy Reduction. International Journal of Chemical Reactor Engineering. 2025. Accepted. SCI Impact Factor: 1.4
19. Om Prakash, Pranav Nayan, Asim Ahmad, Ashmore Mawire, Rajeshwari Chatterjee, Shubham Sharma, A Kumar, F Awwad, M Khan, E Ismail. Assessing Energy Performance and Payback Period of Residential Building Retrofits in a Smart City: A Case Study. Energy Exploration and Exploitation, a SAGE ACCEPTED
20. Vijay Kumar Pandey, Om Prakash, Asim Ahmad, Biplab Das, Shubham Sharma, F Awwad, M Khan, E Ismail. Enhancing Solar Parabolic Trough Collector Efficiency with Al<sub>2</sub>O<sub>3</sub> and Therminol VP-1 Nanofluids. ACCEPTED. Energy Exploration and Exploitation.
21. Ranbir Kumar, Deep Shikha, Smit Anand, Sanjay Kumar Sinha, Paresh Kumar Mohanty, Sanjay Mhaske, Abhinandan Kumar, and Arkadeb Mukhopadhyay. "Integration of 3% Silver-Doped Hydroxyapatite Coated on Alumina Using Radio Frequency Magnetron Sputtering for Superior Bioactivity, Mechanical and Electrical Properties, and Wear Resistance." ACS Biomaterials Science & Engineering (2025). (Accepted)
22. Reetik Singh, Abhinandan Kumar, Arkadeb Mukhopadhyay, S. S. Mahapatra, Jehan Y. Al-Humaidi, A. Choudhury, S. K. Mukherjee, and Mohammed M. Rahman. "Enhancing primer performance: A study of graphene blending percentage and its effects on corrosion resistance, mechanical strength, and wettability." Journal of Alloys and Compounds 1020 (2025): 179359.

# Journal Publications

23. Subhash Kumar, Arun Kumar Kadian, Mukesh Sharma, Anil C. Mahato, and Arkadeb Mukhopadhyay. "Development of Ni-B coating through the aid of artificial intelligence." *Materials Letters* 378 (2025): 137621.
24. Abhinandan Kumar, Tamonash Jana, Sushanta Ghuku, and Arkadeb Mukhopadhyay. "Fractal, tribo-mechanical and corrosion characterization of hydrophobic and lead free electroless Ni-B mono and bi-layer coating developed using artificial intelligence." *Surface Topography: Metrology and Properties* 13 (2025): 015015.
25. Arkadeb Mukhopadhyay, and Sarmila Sahoo. "Surface Engineering of Construction Steel for Corrosion Protection–A Review." *Portugaliae Electrochimica Acta* 44 (2026): 441-463
26. Mushtaque Momin & Mukesh Sharma, 2025, "Flow regime and volume fraction of kerosene-water flows through an inclined macro-channel tube coupled with return bend – An experimental approach", *Alexandria Engineering Journal*, 123, pp 55-70.
27. Vijay Kumar Pandey, Om Prakash. Experimental Investigation and Simulation of a Helical Coil Heat Exchanger with Hematite Thermal Reservoir. *Environmental Progress & Sustainable Energy*. SCI. Impact Factor: 2.1. 2025;e14562.
28. Asim Ahmad, Om Prakash, L. S. Brar, Kashif Irshad, S. M. Mozammil Hasnain, Prabhu Paramasivam, Abinet Gosaye Ayanie. Effect of Wall, Roof and Window-to-Wall Ratio on the Cooling and Heating Load of a Building in India. *Energy Science & Engineering*. 2025; 1–25. SCI Impact Factor: 4.18
29. A. Prakash, P. Singh, P. Jayakrishna, A. S. Vaka, P. Talukdar , S. Ganguly, Saurav Chakraborty, 'Estimating non-linear heat flux in continuous billet casting process with limited sensors', *Heat Transfer Eng.*, Taylor & Francis, vol. 46(7), (2025), pp. 585-600.
30. Smita Singh, s. Sengupta, P. Surin, Gautam Sen, Rajeev Kumar and Sweta Singh, "Synthesis and Formulation of Modified Milk Protein and its Study as an Adhesive for Wood Binding", *Journal of Polymer Engineering*, vol 45 (2), Jan 2025.

# Journal Publications

31. Smita Singh, Gautam Sen, Sumanta K. Sengupta, Praween Surin and Rajeev Kumar, “Development of Adhesive from Soy based Copolymer Modified through Graft Copolymerization” Polymer Bulletin, 11th June 2025, <https://doi.org/10.1007/s00289-025-05844-x> (Impact factor – 3.1)
32. Ishita Rai and Rajeev Kumar, “Heat Transfer Analysis of a Longitudinal Fin Attached to a Beta -Type Stirling Engine”, Archives of Thermodynamics, Vol 46(3) ,2025, Page No. - 51-60,Dol: 10.24425/ather.2025.156578
33. Sushanta Ghuku, Sarmila Sahoo, & Tanmoy Mukhopadhyay (2025). Nonlinear elasticity tailoring and failure mode manipulation of functionally graded honeycombs under large deformation. International Journal of Non-Linear Mechanics, Vol. 168, Article: 104935. DOI: <https://doi.org/10.1016/j.ijnonlinmec.2024.104935>. [SCIE, Impact Factor: 2.8]
34. Sushanta Ghuku, Susmita Naskar, & Tanmoy Mukhopadhyay (2025). Stimuli- responsive programmable mechanics of bi-level architected nonlinear mechanical metamaterials. Mechanics of Materials, Vol. 206, Article: 105333., DOI: <https://doi.org/10.1016/j.mechmat.2025.105333>. [SCIE, Impact Factor: 3.4]
35. Abhinandan Kumar, Tamonash Jana, Sushanta Ghuku, & Arkadeb Mukhopadhyay (2025). Phase transformation, fractal, tribo-mechanical and corrosion characterization of electroless Ni-B-Cu-Sn coating post heat treatment. Physica Scripta, DOI: <https://doi.org/10.1088/1402-4896/ae1fb9>. [SCIE, Impact Factor: 2.6]

# Conference Publications

1. Phuleshwar Baitha, Richa Pandey, Abhinav Amar Thakur and Preety Aruna Kerketta, "Process Parameter Analysis of 3D Printing for Better Product Quality", International Conference on Recent Advances in Mechanical Infrastructure (ICRAM2025), IITRAM, 10-12 Jan, 2025
2. R Maiti, Saurav Chakraborty, 'DEM Simulation of Projectile Impact on a Granular Bed'. In: Kothadia, H., Arun, K.R., Rajesh, G., Arakeri, J.H. (eds) Proceedings of Fluid Mechanics and Fluid Power (FMFP) 2023, Lecture Notes in Mechanical Engineering, Springer, Singapore, Vol. 2 (2025), pp. 393-403.
3. R. Kurly, S. Sharuk, A. Roy, Saurav Chakraborty, 'Application of inverse heat transfer method in heat treatment of steel billet quenching', presented in the International Conference on Materials, Manufacturing and Management for Industry 4.0 (IC3MI), 5-6 December 2025, Birla Institute of Technology Mesra, Ranchi, India
4. Ishita Rai and Rajeev Kumar, Heat Transfer Analysis of a Conductive Radiative Moving Fin Attached to a Beta – Rype Stirling Engine, International Conference on Heat Transfer and Fluid Flow, Chennai, 29<sup>th</sup> and 30<sup>th</sup> March 2025.
5. Ranjan, C. & Kumar, K. (2025). Quadrotor Control Systems: A Theoretical and Experimental Perspective. In M. Mellal (Ed.), *Innovations and Developments in Unmanned Aerial Vehicles* (pp. 325-348). IGI Global Scientific Publishing.
6. Ranjan, C. & Kumar, K. (2025). Innovations in Autonomous Drones for Precision Agriculture: Techniques and Applications. In D. Bora & R. Bania (Eds.), *Computer Vision Techniques for Agricultural Advancements* (pp. 321-362). IGI Global Scientific Publishing.

# Conference Publications

7. Ranjan, C. & Kumar, K. (2025). Innovations in Autonomous Drones for Precision Agriculture: Techniques and Applications. In D. Bora & R. Bania (Eds.), *Computer Vision Techniques for Agricultural Advancements* (pp. 321-362). IGI Global Scientific Publishing.
8. Singh, R. K., Tiwari, S. K., & Kumar, K. (2025). Multi-Product CONWIP System Performance Analysis: Modeling and Analysis. In O. Chiwaridzo & M. Dzingirai (Eds.), *Strategic Repositioning in Times of Corporate Crisis: Green Management and Technology Adoption* (pp. 273-302). IGI Global Scientific Publishing.
9. Ranjan, C., Srinivas, J., Balaji, P. S., & Kumar, K. (2025). Precision Agriculture: Leveraging Artificial Intelligence and Drones for Eco-Friendly Farming. In M. Tariq & R. Sergio (Eds.), *Cases on AI-Driven Solutions to Environmental Challenges* (pp. 175-212). IGI Global Scientific Publishing.
10. Kumar, K. & Ranjan, C. (2025). Crafting a Comprehensive Research Proposal: A Guide for Academicians in Higher Education. In A. Mdikana (Ed.), *Enhancing Research Output in Higher Education: Research Proposals, Profiles, and Publishing* (pp. 243-260). IGI Global Scientific Publishing.
11. Ranjan, C., Chakraborty, B., Srinivas, J., & Kumar, K. (2025). Ethical Considerations in Privacy-Preserving Industrial Security of Cognitive Internet of Things-Enabled Drones. In A. Garg, F. Al-Turjman, & S. Khan (Eds.), *Innovations in Blockchain-Powered Intelligence and Cognitive Internet of Things (CloT)* (pp. 33-56). IGI Global Scientific Publishing.

# Conference Publications

12. P. R. Mahto, A. C. Mahato, M. Sharma, P. Mahata, J. P. Tripathi, Various vibration harvesting techniques for rotating system: An overview, *Journal of Vibration Engineering & Technologies*, 13(1), 27 (2025)
13. A. Prakash, P. Singh, P. Jayakrishna, A. S. Vaka, P. Talukdar, S. Ganguly, Saurav Chakraborty, 'Estimating non-linear heat flux in continuous billet casting process with limited sensors', *Heat Transfer Engineering*, Taylor & Francis, vol. 46(7), (2025), pp. 585-600.

# Books and Book Chapters

1. *Writing Skills for Scientific Communication*, CRC Press, USA (ISBN: 978-1-003-48582-7), Kumar, K. and Ranjan, C.

<https://www.taylorfrancis.com/books/mono/10.1201/9781003485827/writing-skills-scientific-communication-kaushik-kumar-chikesh-ranjan>

2. *Smart Materials – Electro-Rheological Fluids, Piezoelectric Smart Materials, Shape – Memory Alloys*, Verlag Walter de Gruyter GmbH, GERMANY. (ISBN 978-3111379012), Kumar, K., Ranjan, C.

<https://www.degruyter.com/document/isbn/9783111379623/html>

3. *Computer Applications in Design CAD/CAM: With Modeling & Analysis Software* (ISBN 978-93-58708-00-4), S. Chand and Company Limited, New Delhi, INDIA, Ranjan, C., Jha, S. K. and Kumar, K.

<https://www.schandpublishing.com/books/tech-professional/computer-science/computer-applications-design-cadcam-with-modelling-analysis-software/9789358708004/>

4. *Robotics* (ISBN 978-93-58706-16-1), S. Chand and Company Limited, New Delhi, INDIA, Ranjan, C. and Kumar, K.

<https://www.schandpublishing.com/books/tech-professional/computer-science/robotics-students-btech-be-bsc-engg-aicte-pattern/9789358706161/>

5. *Advances in Thermo-Fluids and System Design*, Om Prakash, Lakhbir Singh Brar, Arkadeb Mukhopadhyay, Saurav Chakraborty and Sushanta Ghuku, BS Publications, Hyderabad, India, 2024. ISBN: 978-93-95038-95-9

# FDPs, Workshops and Seminars



Two-Day Workshop on “Heat Transfer and Characterization Techniques of Nanoparticles and Nanofluids” on 20th–21st September 2025, under the Scientific Social Responsibility (SSR) Policy of ANRF-SERB



ANRF-sponsored SSR program on 29/08/2025

# FDPs, Workshops and Seminars



AutoCAD Workshop Conducted for Department Technical Staff



Prof. Dipti Prasad Mishra served as Guest Speaker at the JCSTI-Sponsored High-end Workshop held during 13 – 17 January 2025 at NIT Jamshedpur.

Rajeev Kumar, Abhijit Nag and Arkadeb Mukhopadhyay attended a 2-Day Workshop on Rocket Technologies from 1st May 2025 to 2nd May 2025, organized by the Department of Space Engineering and Rocketry, Birla Institute of Technology, Mesra, Ranchi.

# FDPs, Workshops and Seminars



उन्नत भारत अभियान  
शिक्षा मंत्रालय, भारत सरकार का एक प्रमुख कार्यक्रम  
**UNNAT BHARAT ABHIYAN (UBA)**  
a flagship program of Ministry of Education (MoE), GOI  
शिक्षित भारत-स्वस्थ भारत- स्वच्छ भारत- स्वावलंबी भारत- संपन्न भारत



## WORKSHOP ON UNNAT BHARAT ABHIYAN ACTIVITIES - 2025



Department of Mechanical Engineering, organized a 5 days' workshop aimed to provide second-year students hands-on training in the design, operation, and maintenance of rural development projects on Biogas plant, Solar Water heater and livelihood developed equipment's for economic generation activities in rural areas from 08.12.25 to 12.12.25 with the collaboration of Unnat Bharat Abhiyan after the end semester examination of mechanical engineering students.

The workshop was formally inaugurated on 08.12.2025 by Dr. A. K. Roy, Head of the Department of Mechanical Engineering, Dean, Faculty Affairs, Dr. Ashok Sharon, Prof. Arvind Kumar, Professor of Mechanical Engineering, Mr. S. K. Singh, Ex. Scientist, DRDO and Workshop Coordinator Dr. Rajeev Kumar.

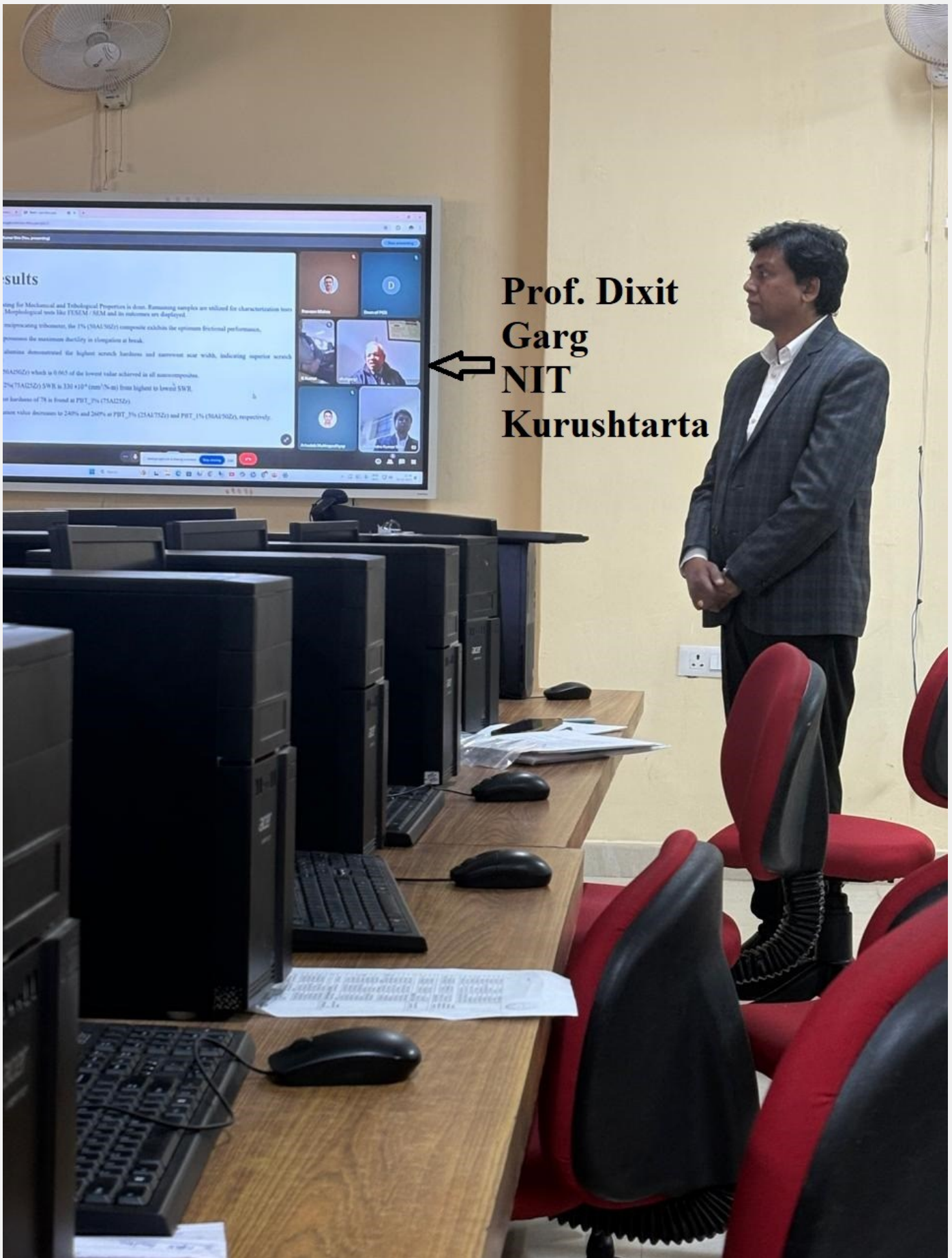
# FDPs, Workshops and Seminars



BIT Mesra Hosted Workshop on Nanotechnology and Heat Transfer. The Department of Mechanical Engineering at Birla Institute of Technology, Mesra, Ranchi, recently conducted a two-day workshop on "Heat Transfer and Characterization Techniques of Nanoparticles and Nanofluids" on September 20-21, 2025. The workshop, funded by ANRF, brought together experts and researchers to discuss the latest developments in nanotechnology and its applications in heat transfer. Inaugurating the workshop, Vice Chancellor Prof. Indranil Manna, Dean of Faculty Affairs Dr. Ashoke Sharon and Head of Mechanical Engineering Department Dr. A. K. Roy emphasized the importance of nanotechnology in modern research. Organized by Convener Dr. Sushil Kumar Dhiman and his team, the workshop was a successful initiative in promoting research and innovation in the field.

The workshop covered topics such as nanoparticles, nanofluids, and heat transfer techniques, with expert lectures and hands-on sessions. Esteemed speakers Dr. Gautam Serkhel, Dr. Arbind Kumar, Dr. S.K. Dhiman, Dr. Gayari Paul, etc., had discussed characterization methods, augmented heat transfer and thermal management in various applications using nanofluids. The workshop provided a platform for researchers to explore new avenues in heat transfer and nanotechnology, with practical sessions on advanced characterization techniques, synthesis of nanoparticles, and thermoelectric generators.

# Students Section



**Prof. Dixit  
Garg  
NIT  
Kurushtarta**

PhD viva voce of Mr. Jeenendra Kumar Shiv was held on 15/12/2025, conducted by Prof. Dixit.

# Students Section



BIRLA INSTITUTE OF TECHNOLOGY  
MESRA, RANCHI



BACHELOR OF TECHNOLOGY (2021-2025)  
DEPARTMENT OF MECHANICAL ENGINEERING

Batch photography of VIth Sem. Students (Sec. A)



BIRLA INSTITUTE OF TECHNOLOGY  
MESRA, RANCHI



BACHELOR OF TECHNOLOGY (2021-2025)  
DEPARTMENT OF MECHANICAL ENGINEERING

Batch photography of VIth Sem. Students (Sec. B)

# Students Section



**FIREBOLT RACING**

## EVENTS



**BAJA SAE India 2025:** Firebolt Racing showcased its ATV alongside India's top collegiate teams, delivering exceptional design and dynamic performance. The vehicle earned widespread acclaim for its innovation, reliability, and outstanding overall engineering excellence.



**Military Expo, Ranchi:** Firebolt Racing exhibited its All-Terrain Vehicle before State Defence Minister Shri Sanjay Seth, senior Army engineers, paramilitary officers, and dignitaries, who inspected the vehicle and praised the team's impressive indigenous engineering capabilities.



**Presidential Visit:** Smt. Droupadi Murmu's visit to Firebolt Racing was a moment of pride and inspiration. Her presence honored the team's dedication to innovation and engineering excellence, motivating young minds to pursue mastery in motorsports and beyond.



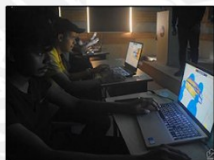
Departmental UG Students Activities

# Students Section

## EVENTS



**Automobile Workshop:** Firebolt Racing held a Basics of Automobile Engineering workshop for all engineering branches, covering vehicle fundamentals, component design, testing, and manufacturing, attracting wide participation and offering real-world automotive insights.



**CAD Workshop:** CAD workshop offered hands-on training in computer-aided design, guiding participants through the fundamentals of 3D modeling. It empowered aspiring engineers to bring their ideas to life, combining creativity with technical skills for real-world applications.



**Drivecraft:** Firebolt Racing's Drivecraft was a high-octane blend of knowledge and engineering. It began with an intense automotive quiz, followed by virtual ATV design and racing. The event tested creativity, skill, and control in a thrilling contest of innovation and adrenaline.



**Presidential Visit: (15/2/2025):** Smt. Droupadi Murmu's visit to Firebolt Racing was a moment of pride and inspiration. Her presence honored the team's dedication to innovation and engineering excellence, motivating young minds to pursue mastery in motorsports and beyond.

# Students Section



5 Days Hands-on Training on AutoCAD held on 02/05/2025



Presidential Visit: ( **15/2/2025**): Smt. Droupadi Murmu's visit to Firebolt Racing was a moment of pride and inspiration. Her presence honored the team's dedication to innovation and engineering excellence, motivating young minds to pursue mastery in motorsports and beyond.

# Students Section

## Departmental Society

**THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS**  
STUDENT'S CHAPTER, BIT MESRA, RANCHI

ASME  
SETTING THE STANDARD  
BIRLA INSTITUTE OF TECHNOLOGY MESRA  
STUDENT SECTION

**EXECUTIVE BODY  
2024-25**

<b>FACULTY ADVISOR</b>	Dr. Saurav Chakraborty
<b>CHAIR</b>	Auyon Binayak Ghosh
<b>VICE CHAIR</b>	Pratyush Pallav
<b>SECRETARY</b>	Priyanshu Kumar
<b>TREASURER</b>	Kunal Kumar Saw
<b>JOINT SECRETARY</b>	Shashank Raj
<b>JOINT TREASURER</b>	Arpit Mathur
<b>SOCIAL MEDIA MANAGER</b>	Agnik Choudhary, P Anand Verma, Mayank Milind, Amritanshu Kushwaha
<b>SPONSORSHIP LEAD</b>	Atulya Verma, Lokesh Kumar Gupta
<b>EXECUTIVE MEMBER</b>	Aditya Potdar, Aryan Aryan, Debanshu Banerjee, Priyabrata Das, Shreyas Chavan, Ramesh Oraon



Hands on Training to 3<sup>rd</sup> Year Students on Screw Making with the Help of Industry at Kokar Industrial Area

# Students Section



Maths work workshops conducted for Students on 10/03/2025



**BAJA SAE India 2025::( 8/1/2025 – 10/1/2025):** Firebolt Racing hosted at NATRAX in Pithampur, near Indore, showcased its ATV alongside India's top collegiate teams, delivering exceptional design and dynamic performance. The vehicle earned widespread acclaim for its innovation, reliability, and outstanding overall engineering excellence. 41

# Students Section



Military Expo, Ranchi: (13/9/2024) Firebolt Racing exhibited its All-Terrain Vehicle before State Defence Minister Shri Sanjay Seth, senior Army engineers, paramilitary officers and dignitaries, who inspected the vehicle and praised the team's impressive indigenous engineering capabilities.



This Certificate is presented to

**BIT Mesra**

*For securing the Student Section Achievement Award of*

**ASME India Student Section Recognition Program**

**2024 - 2025**

**Richard Cowan, P.E., Ph.D.**  
Senior Vice President

Member Development and Engagement Sector, ASME

The ASME student society of BIT Mesra has been awarded the student section achievement award during October 2025 for its activities during the year 2024-2025, as part of the ASME India Student Section Recognition Program.

# List of Faculty Members

S.No.	Name of Faculty Members	Employee Code	Designation	Email
1	Dr. Arbind Kumar	05015	Professor	arbindkumar@bitmesra.ac.in
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3	Dr. A.K.Roy	10033	Associate Professor	akroy@bitmesra.ac.in
4	Dr. Kaushik Kumar	2291	Professor	kkumar@bitmesra.ac.in
5	Dr. Rajeev Kumar	2429	Associate Professor	rajeevkumar@bitmesra.ac.in
6	Dr. Richa Pandey	2430	Assistant Professor	richapandey@bitmesra.ac.in
7	Dr. S.K.Dhiman	9154	Assistant Professor	skdhiman@bitmesra.ac.in
8	Dr. P. Mishra	2797	Assistant Professor	pmishra@bitmesra.ac.in
9	Dr. O. P. Pandey	2678	Assistant Professor	oppandey@bitmesra.ac.in
10	Dr.Sujeet Kumar Mishra	8849	Assistant Professor	sujeetmishra@bitmesra.ac.in
11	Dr. Abhijit Nag	10264	Assistant Professor	abhijitnag@bitmesra.ac.in
12	Dr. Om Prakash	10720	Assistant Professor	omprakash@bitmesra.ac.in
13	Dr. Nirmal Kumar	10731	Assistant Professor	nirmal@bitmesra.ac.in
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15	Dr. Lakhbir Singh Brar	10018	Assistant Professor	brarls@bitmesra.ac.in
16	Dr. Arun Kumar Kadian	10814	Assistant Professor	arun.kadian@bitmesra.ac.in
17	Dr. Mukesh Sharma	10815	Assistant Professor	mukeshsharma@bitmesra.ac.
18	Dr. Arkadeb Mukhopadhyay	10816	Assistant Professor	arkadeb.mukhopadhyay@bitmesra.ac.in
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20	Dr. Praveen James Sanga	9163	Assistant Professor	praveenjames.sanga@bitmesra.ac.in
21	Dr. Ritwik Maiti	10837	Assistant Professor	ritwik.maiti@bitmesra.ac.in
22	Dr. Saurav Chakraborty	10839	Assistant Professor	sauravc.mech@bitmesra.ac.in
23	Dr. Faisal Rahmani	10874	Assistant Professor	faisalrahmani@bitmesra.ac.in
24	Dr. Sushanta Ghuku	10887	Assistant Professor	sushanta.ghuku@bitmesra.ac.in
25	Dr. Abhishek Kr. Kashyap	10992	Assistant Professor	akkashyap@bitmesra.ac.in
26.	Dr. Ankur Chattopadhyay	11011	Assistant Professor	ankur.chattopadhyay@bitmesra.ac.in