





SPRING'25

PIE NEWSLETTER

DEPT. OF PRODUCTION & INDUSTRIAL ENGG.
BIT MESRA



MESSAGE FROM
HEAD OF THE DEPARTMENT

It gives me immense pleasure while writing this for the maiden newsletter of our PIE Department. At the outset, I must thank our honorable Vice Chancellor for the motivation of publishing Department e-newsletter and congratulate the editorial team on their successful execution. Undoubtedly, an e-newsletter will have a much wider reach than a print one in the present times. The strength of the Department in terms of equipment and research facilities, achievements by faculty and students, visits by eminent persons, *etc*. will find a place in the newsletter published biannually at the end of Spring and Monsoon sessions. I request all the stakeholders to encourage this initiative and my best wishes for the PIE newsletter.

Dr. L. N. Pattanaik



ABOUT THE DEPARTMENT

The Department of Production Engineering, established in 1964, has continually worked towards providing quality education to undergraduates and preparing them to meet the evolving needs of the manufacturing industry. The department focuses on developing students' technical skills and practical knowledge, ensuring they are well-equipped for real-world industrial challenges. It has built strong collaborations with industries, R&D centers, consultancy firms, and academic institutions, promoting research, innovation, and industry exposure. These partnerships enhance learning by aligning academic efforts with current manufacturing practices and technologies. Positioning itself as a leader in emerging technologies, the department emphasizes modern manufacturing techniques and aims to develop graduates who are both technically skilled and managerially capable. In the face of globalization and industrial change, the department remains committed to academic excellence and industry relevance.

ACADEMIC PROGRAMMES

B.Tech

The B.Tech program in Production and Industrial Engineering at BIT Mesra is a dynamic blend of core engineering, manufacturing sciences with state-of-the-art technologies, and industrial management. Designed under the Choice Based Credit System (CBCS), the curriculum equips students with a robust foundation in subjects such as Operations Research, Supply Chain Management, Manufacturing Processes, Machine Tool Design, Statistical Quality Control, Advanced Automation, Unconventional Machining, *etc.*

Students are exposed to advanced technologies including Computer Integrated Manufacturing, Additive Manufacturing, Robotics, and Cyber-Physical Systems—ensuring alignment with Industry 4.0 standards. Through electives like Lean Six Sigma, AI & Data Analytics, and Sustainable Manufacturing, the program fosters innovation, problem-solving, and continuous improvement mindsets.

Hands-on training via extensive lab work, industry projects, internships, and a strong focus on communication, teamwork, and project management ensures that graduates are not only technically sound but also industry-ready. This holistic education empowers students to thrive in manufacturing, logistics, R&D, and emerging tech-driven industrial ecosystems.



RUHI SINGH

I am Ruhi Singh, currently pursuing Production and Industrial Engineering at BIT Mesra, Ranchi. My journey in the department has been truly enriching. The faculty members and staff are extremely supportive and always approachable, which creates a positive and encouraging learning environment. Our classrooms are filled with friendly and well-mannered peers, making academic life more enjoyable and collaborative. I feel especially grateful to our Head of Department, who constantly motivates us to grow and excel in our fields. With the guidance and encouragement of the department, I had the opportunity to undertake a research project under Dr. Gayatri Paul Ma'am, one of the kindest and most inspiring mentors I have had. Being a part of this department has been a proud and fulfilling experience for me.

M.Tech

The M.Tech program in Production and Industrial Engineering at BIT Mesra is a dynamic, research-oriented postgraduate course designed to equip students with the technical expertise and strategic insight required in modern manufacturing and operations environments. Rooted in a comprehensive curriculum aligned with industry standards, the course focuses on advanced subjects such as Computer Integrated Manufacturing, Advanced Manufacturing Technologies, Robotics, Data Analytics, Supply Chain Management, and Modelling & Simulation.

Through hands-on labs in CAD/CAM, simulation, and CNC machining, alongside exposure to smart manufacturing technologies and industrial automation, students gain proficiency in tools and techniques shaping the future of engineering. The curriculum is complemented by electives in Additive Manufacturing, Optimization, Quality Engineering, and Soft Computing, fostering innovation and multidisciplinary thinking.

With a strong emphasis on problem-solving, project management, and real-world industrial applications, the M.Tech program ensures graduates are industry-ready professionals, capable of addressing complex engineering challenges and contributing to sustainable technological development.



NIKITA KUMARI

I am Nikita Kumari, a recent postgraduate from the Department of Production and industrial Engineering at Birla Institute of Technology, Mesra. From 2023 to 2025, I had the privilege of pursuing my Master of Technology (M.Tech), a journey that has been both transformative and deeply fulfilling. My inclination towards choosing Production and industrial Engineering was because of my interest in manufacturing systems and industrial automation. Though I was the alone girl in my branch, I took up the challenge with determination. Faculty and peer support aided in my growth both technically and as an individual. At first, I was self-doubting, but I developed self-confidence gradually through diligence and persistence. Participation in projects and seminars developed my communication and leadership skills. The friendly and encouraging atmosphere at BIT Mesra empowered me tremendously. This experience made me stronger, confident, and more independent as an engineer. I hope my experience encourages more young girls to take up core engineering disciplines courageously.

PhD

The PhD programme at the Department of Production and Industrial Engineering, BIT Mesra, is designed to foster research excellence and industrial relevance. It offers in-depth study in core manufacturing areas like Machining, Welding, Metal Casting, Metal Forming, and Powder Metallurgy, along with modern technologies such as Additive Manufacturing, CAD/CAM, Robotics, FMS, and CIM.

The curriculum also covers Lean Manufacturing, Six Sigma, Quality Engineering, and Supply Chain Management to strengthen productivity and quality skills. Emphasis on Human Factors, Work Design, and Facility Layout ensures practical problem-solving and efficiency. With focus areas like Green Manufacturing, Reliability Engineering, and Advanced Operations Research, the programme equips scholars to innovate and lead in the evolving manufacturing landscape.



Sharddha Agarwal

I am Shraddha Agrawal, currently pursuing a Ph.D. in the Department of Production and Industrial Engineering (PIE). My research focuses on the integration of blockchain technology into supply chain systems, an area of growing relevance and impact. The department offers a nurturing research environment, guided by experienced and supportive faculty members, which has greatly contributed to my academic growth. The faculty members of my doctoral committee have been consistently encouraging and deeply invested in the progress of my research. Their insightful guidance, constructive feedback, and unwavering support have played a pivotal role in shaping the direction and quality of my Ph.D. work. In addition, my involvement in interdisciplinary research, publishing scholarly work, and presenting at various conferences have significantly enhanced my critical thinking and professional development. Having completed over three years of my Ph.D. journey, I can confidently say that the experience has been both transformative and intellectually fulfilling.

NEW MACHINES

INSTALLATION AND LAB DEVELOPMENT IN SPRING 25

- **MELTIO M450 METAL 3D PRINTER**



The **Meltio M450** is a cutting-edge metal 3D printer designed specifically to serve industrial applications without requiring complex or expensive industrial infrastructure. Engineered with versatility and accessibility in mind, the M450 stands out for its affordability, reliability, safety, and ease of use. This makes it an ideal solution for institutions, research labs, small-scale manufacturers, and R&D centers looking to explore or expand their capabilities in metal additive manufacturing.

- **MODULAR MANUFACTURING AUTOMATION TRAINER**



A Modular Manufacturing Automation Trainer is a flexible educational system that replicates real-world industrial automation processes. It allows users to gain hands-on experience with components like sensors, actuators, PLCs, and robotic arms. Its modular design enables customization for various training needs, making it ideal for engineering and technical education. This trainer helps learners understand, operate, and troubleshoot automation systems, effectively bridging the gap between classroom theory and practical industrial applications.

DEPARTMENTAL VISITS/ WORKSHOPS/ SEMINAR

- ## VISIT of Prof. JANAT SHAH



On February 10th, 2025, Prof. Janat Shah, the founding Director of IIM Udaipur and a current Executive Council Member at BIT Mesra, visited the Department of Production and Industrial Engineering. During his visit, Prof. Shah toured the department's various labs, gaining a firsthand understanding of the ongoing research and technological advancements. He also interacted with all the research scholars of Pie in the conference hall, providing valuable guidance on enhancing their research capabilities. Additionally, he engaged with faculty members, offering advice on the importance of publishing high-impact research papers. His counsel emphasized the need for innovation, quality, and academic rigor to make meaningful contributions to the field. This insightful interaction proved to be an excellent opportunity for faculty members and research scholars alike to refine their research strategies and strengthen their academic vision moving forward.

- ## VISIT of Prof. FIROZ ALAM & Prof. AKSHOY R. PAUL



On February 18th, 2025, the Production and Industrial Engineering (PIE) Department at BIT Mesra had the privilege of hosting Professor Firoz Alam (RMIT University, Melbourne) and Professor Akshoy R. Paul (MNIT Allahabad).
The distinguished guests explored the advanced laboratories and infrastructure of the PIE department, followed by interactive sessions with students, scholars, and faculty members from the PIE, Mechanical, and Space Engineering & Rocketry (SER) departments. Discussions focused on emerging research trends, interdisciplinary collaboration, and innovation in engineering education.
The professors also visited the SER and Mechanical Engineering departments, gaining insights into ongoing projects. Their valuable perspectives and expertise left a lasting impact, inspiring students and faculty alike.

TWO-DAY WORKSHOP ON COMPOSITE MATERIALS



The Department of Production & Industrial Engineering (PIE), BIT Mesra, successfully organized a two-day workshop on "Composite Materials: Manufacturing, Characterization, and Applications" on 21st & 22nd February 2025. The workshop was conducted under the Scientific Social Responsibility (SSR) Policy of SERB-DST, Government of India and brought together experts, faculty, scholars, and students to explore advancements in composite materials.

The event commenced with an inaugural session by Dr. Joyjeet Ghose, followed by a technical talk on "Techniques for Composite Characterization" by Dr. Gaytri Paul. Hands-on training sessions were conducted on Automatic Hardness Testing, Tribo-Testing, UTM & XRD, allowing participants to gain practical insights into material characterization techniques.

Day two featured an insightful session on "Metal-Polymer Structural Composites" by Dr. Bappa Acherjee, covering fabrication techniques, properties, and future prospects. Additionally, Dr. Joyjeet Ghose delivered a session on "Manufacturing and Characterization of Aluminium Alloy Hybrid Nanocomposites for Automotive Applications."

The workshop served as a valuable platform for participants to engage in discussions, gain hands-on experience, and deepen their understanding of composite materials. The PIE Department extends its gratitude to all speakers, coordinators, and attendees for making this event a success.

ONE-DAY RESEARCH FACILITY TRAINING PROGRAM



The Department of Production & Industrial Engineering (PIE), BIT Mesra, successfully organized a One-Day Research Facility Training Program on March 1st, 2025, under the SERB-CRG Project titled "Development of Hard and Wear-Resistant Coating for Hydraulic Cylinders by Laser Surface Cladding as a Substitute for Hard Chrome Plating." The event was held as part of the Scientific Social Responsibility (SSR) Policy of SERB-DST, Government of India and focused on cutting-edge advancements in material coatings.

The day commenced with an inaugural talk by the Head of the Department, PIE, outlining the research roadmap for the department. This was followed by a keynote lecture by Prof. (Dr.) Indranil Manna, who provided deep insights into Laser Surface Cladding for Hard and Wear-Resistant Coatings in Hydraulic Cylinders.

In the second technical session, Dr. Bappa Acherjee delivered an engaging talk on "How to Identify Key Papers and Studies in Your Research Area," guiding participants on effective literature review techniques.

The post-lunch session featured hands-on training in hardness testing, wear testing, optical microscopy, and surface roughness measurement, coordinated by Dr. Gayatri Paul. Participants also had the opportunity to explore departmental research facilities, led by Dr. Somak Datta. The event concluded with a valedictory session and certificate distribution, marking the successful completion of an enriching and insightful training program.

• VISIT of TATA STEEL Experts



An expert team of four led by Dr. Kanwar Singh Arora, Head - Materials Welding & Joining Research Group, Tata Steel Limited, Jamshedpur visited PIE on April 29th, 2025 to hold technical discussion among project team members on 'Laser Additive Manufacturing and Refurbishment of High-Temperature Resistant Structural Components (LAMAR)' project Jointly sponsored by DST-TDP (Innovation, Technology Development and Deployment), BIT Mesra and Tata Steel. HoD(PIE) presented a brief introduction on research facilities of the Department and they walked through various labs. A demonstration was carried out on MELTIO M450 metal 3D printer which was part of their project work.

• VISIT of Mr. J D PATIL



On May 1st, 2025, Mr. J. D. Patil, Director and Senior Executive Vice President for L&T, President INAE was in the Institute for a Workshop on Rocket Technologies and had a brief visit PIE. He met with some faculty members and visited important lab facilities. The products from metal 3D printer in the Department were the topic of discussion during the interaction. He emphasized the role of additive manufacturing and innovation in materials development in space technology and research.

ALUMNI TALKS



VIKAS KUMAR
PRODUCTION ENGINEERING (2003 - 2007)

Sr. Software Engineering manager at GOOGLE | Ex-Amazon | NC State University

Glad to know about the biannual newsletter being published by the Department of PIE, from where I graduated in 2007.I have many fond memories of my undergraduate student life there, which provided the right platform to build my professional career. My best wishes for the Department including my juniors and my regards to the teachers.

SUSHANT DUTTA

PRODUCTION ENGINEERING (2004 - 2008)

Co-founder, 1Vendor Platform | Ex-Amazon & Britannia | IIM Bangalore Alumnus



As I look back on my days in the Production and Industrial Engineering department, I am filled with immense nostalgia and gratitude. The years I spent here were not just about academics, but about friendships, growth, and learning from some of the most dedicated and inspiring faculty members. The memories—be it late-night project discussions, college fests, or even those classroom lectures—are ones I will always cherish.To the current students, I have a simple message: Believe in yourself. Be confident in your journey. Invest time in improving your communication skills—they play a crucial role in both personal and professional growth. And above all, stay curious, work hard, and always strive to be a better version of yourself. Your time here is the foundation for a fulfilling future—make the most of it!

SHUBHAM SAURABH

PRODUCTION ENGINEERING (2014 - 2018)

Technical Project Manager @TESLA



Looking back, my journey from the classrooms of BIT Mesra to the innovation-driven floors of Tesla has been nothing short of transformative. The rigorous Production Engineering program at BIT Mesra was more than just an academic pursuit—it was the launchpad that propelled me into the world of cutting-edge manufacturing and global supply chain leadership. At BIT Mesra, I learned to break down complex engineering problems into actionable solutions—a skill that became my greatest asset at Tesla. My undergraduate project, where I optimized truck transportation planning and reduced carbon footprints by 20% through regression demand analysis, was my first taste of applying analytical thinking to real-world challenges. This experience laid the groundwork for my later work at Tesla, where sustainability and process optimization are not just goals, but imperatives.

CURRENT SPONSORED RESEARCH PROJECTS

- **Laser Additive Manufacturing and Refurbishment of High-Temperature Resistant Structural Components (LAMAR)** Jointly sponsored by DST-TDP (Innovation, Technology Development and Deployment), BIT Mesra and Tata Steel. Total cost of the project is Rs. 4,35,49,600.

- **Manufacturing and characterization of aluminium alloy hybrid nanocomposite produced by stir-ultrasonic-squeeze casting method for automotive application** Sponsored by DST-SERB-CRG, Total cost of the project is Rs. 40,00,000.

- **Laser-based manufacturing of multi-layer polymer-metal sandwich composite and performance assessment for lightweight material applications** Sponsored by DST-SERB-CRG, Total cost of the project is Rs. 54,00,000.

- **Assessment of Tribological Properties of Graphene based Nanolubricants Developed by Ball Milling for Automotive Applications** Sponsored by DST-SERB-CRG, Total cost of the project is Rs. 32,90,000.

- **Development of hard and wear-resistant coating for hydraulic cylinders by laser surface cladding as a substitute for hard-chrome plating** Funded by ANRF/SERB Grant: Rs. 44,66,264 .

PUBLICATIONS (Sp 2025)

Choudhary, H., Pattanaik, L.N. (2025) Quantitative Optimization Models in Supply Chains: Taxonomy, Trends and Analysis. Arch Computat Methods Eng. https://doi.org/10.1007/s11831-025-10252-5 (SCIE Springer, Impact Factor 9.9)

M. Patil, B. Acherjee, I. Manna, Enhancing wear resistance of railway wheel by laser surface cladding of martensitic stainless steel on high carbon rail steel, Mater Today Commun., 2025, 42, 111353 (IF 3.7). https://doi.org/10.1016/j.mtcomm.2024.111353

Verma, P., Ghose, J., Paul, G., Pandey, V., & Pandey, U. (2025). Enhanced mechanical and tribological performance of AA2014-SiC metal matrix nanocomposites fabricated by a novel stir-ultrasonic-squeeze casting process. International Journal of Cast Metals Research, 1–15. https://doi.org/10.1080/13640461.2025.2469026. SCI (IF 1.3)

G Anwer, B Acherjee, A Deep Learning-based Data-driven Approach for Modeling and Optimization of Laser Transmission Welding of Polypropylene, International Journal of Industrial Engineering: Theory, Applications and Practice, 2025, 3(2), 10265, https://doi.org/10.23055/ijietap.2025.32.2.10265 (IF 1.2)

K Kanishka, B Acherjee, High-Cycle Fatigue and Wear Performance of Low-Carbon Steel Plates Remanufactured with Wire Arc Additive Manufacturing, Materials Today Communications, 2025, 111802, https://doi.org/10.1016/j.mtcomm.2025.111802 (IF 3.7)

A Kumari, B Acherjee, Material Selection for Milling Cutter Inserts in High-Speed Machining Applications Using the CARCACS Method, Results in Engineering, 2025, 105063, https://doi.org/10.1016/j.rineng.2025.105063 (IF 6.0)

Pandey, S., Singh, A.K., Parhi, S. et al. Towards safer steel operations with a multi model framework for accident prediction and risk assessment simulation. Sci Rep 15, 13293 (2025). https://doi.org/10.1038/s41598-025-96028-0

Pandey S, Singh AK, Parhi S. Transforming workplace safety through leveraging predictive analytics and explainable AI in steel industries. Proceedings of the Institution of Mechanical Engineers, Part O. 2025;0(0). doi:10.1177/1748006X251331681

Kumar, P., Kumar, B. & Pratap, S. Experimental Exploration of Specific Wear Rate in Linear Reciprocating Motion Using Dimensional Analysis. Exp Tech (2025). https://doi.org/10.1007/s40799-025-00788-3

Prakash Kumar, Binay Kumar, Suresh Pratap, S.M. Mozammil Hasnain, Basem A. Alkhaleel,Synthesis and predictive modelling of wear behaviour in hybrid aluminum composites, Results in Engineering, Volume 26, 2025, 104612, ISSN 2590-1230, https://doi.org/10.1016/j.rineng.2025.104612.

Prakash Kumar, Suresh Pratap, Binay Kumar, Effect of temperature on the wear properties of the novel hybrid aluminum composite reinforced with ZrB2 and fly ash, Materials Letters, Volume 387, 2025, 138288, ISSN0167-577X, https://doi.org/10.1016/j.matlet.2025.138288.

OUR RECRUITERS



RECENT GRADUATES



"My journey in the Production and Industrial Engineering department has been truly transformative. Studying in this versatile, industry-focused branch exposed me to both traditional manufacturing and advanced technologies like CIM, cyber-physical systems, and supply chain management. From automation to production economics, the curriculum balanced technical depth with business insight—preparing me to contribute meaningfully to industries worldwide."
_ Graduating student feedback (2021-25)

Farewell Message for Batch K21

As the K21 batch bids farewell, the Department extends its heartfelt gratitude and best wishes. Your journey has been marked by dedication, growth, and a spirit of innovation that has left a lasting impression. We are proud to have been part of your formative years and confident you'll continue to uphold the values of excellence and integrity in all your future endeavors.

Wishing you success, fulfillment, and continued curiosity as you step into the next chapter.
—Department of Production and Industrial Engineering
BIT,Mesra

EDITORIAL TEAM

FACULTY EDITORS



Dr. L.N. Pattanaik



Dr. Somak Datta



Dr. Thakur A. Amar



Dr. Bappa Acherjee

STUDENT EDITORS K22



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