## **REPORT**

## **AICTE Training And Learning (ATAL) Academy**

Online Faculty Development Programme (FDP) 2024-25

On

"Sustainable Manufacturing in the Era of Industry 4.0: Paving the Way for a Greener Future"

(Application Number: 1731046059)

Scheduled on: 23<sup>rd</sup> – 28<sup>th</sup> December 2024





Organized By

Department of Industrial and Production Engineering School of Studies of Engineering and Technology Guru Ghasidas Vishwavidyalaya (A Central University) Bilaspur-495009, Chhattisgarh, India

Website: www.new.ggu.ac.in

# RESOURCE PERSONS OF ONLINE SIX DAYS ATAL – FDP 2024-25

Name of Resource Person	Designation & Name of Industry / Institute
Prof. J. R. Gamage	Senior Lecturer  Department of Mechanical Engineering University of Moratuwa Colombo, Sri Lanka
Prof. Yuvraj Gajpal	Associate Professor Asper School of Business, University of Manitoba Winnipeg, Canada
Mr. Shakti Mishra	Planning Manager Landmark Group, United Arab Emirates (UAE)
Prof. Shankar Purbey	Professor & Dean Academics Development Management Institute (DMI), Patna, India
Mr. Gaurav Agarwal	General Manager Central Sustainability Cell Grasim Industries Limited, Aditya Birla Group, Vadodara, India
Prof. Samir Kumar Acharya	Professor  Department of Mechanical Engineering National Institute of Technology (NIT), Meghalaya, India
Dr. Sanjay Kumar Singh	General Manager (Mining & Operations) South Eastern Coalfields Limited (SECL), Bishrampur, India
Prof. Rajeev Agrawal	Associate Professor  Department of Mechanical Engineering Malaviya National Institute of Technology (MNIT), Jaipur, India

Prof. Rupesh Kumar Pati	Professor Operations Management Indian Institute of Management (IIM), Kozhikode, India
Prof. Gajendra Kumar Adil	Professor Shailesh J Mehta School of Management Indian Institute of Technology (IIT), Bombay, India
Prof. Sachin Kumar Mangla	Professor Jindal Global Business School O.P. Jindal Global University, Haryana, India
Prof. Peter Ball	Professor Operations Management University of York, Heslington, United Kingdom (UK)
Dr. Ayush Kumar Gautam	Assistant Professor Department of Management Studies Malaviya National Institute of Technology (MNIT), Jaipur, India

## **TIME TABLE FOR THE SESSIONS**

Day 1 (23/12/24)	Day 2 (24/12/24)	Day 3 (25/12/24)	Day 4 (26/12/24)	Day 5 (27/12/24)	Day 6 (28/12/24)
6:00-6:30 PM Inaugural Session	6:00-7:30 PM (Session 3)  Mr. Shakti Mishra  Planning Manager  Landmark Group,  United Arab Emirates  (UAE)	6:00-7:30 PM (Session 5)  Mr. Gaurav Agarwal  General Manager  Central Sustainability Cell  Grasim Industries Limited,  Aditya Birla Group,  Vadodara	6:00-7:30 PM (Session 7)  Dr. Sanjay Kumar Singh  General Manager  (Mining & Operations)  South Eastern Coalfields  Limited (SECL),  Bishrampur	6:00-7:30 PM (Session 9)  Prof. Rupesh Kumar Pati  Professor  Operations Management  Indian Institute of  Management (IIM),  Kozhikode	2:00-3:30 PM (Session 11)  Prof. Sachin Kumar Mangla Professor Jindal Global Business School O.P. Jindal Global University, Haryana
6:30-8:00 PM (Session 1)  Prof. J. R. Gamage  Senior Lecturer  Department of  Mechanical Engineering University of Moratuwa Colombo, Sri Lanka	7:30-9:00 PM (Session 4)  Prof. Shankar Purbey  Professor & Dean  Academics  Development Management  Institute (DMI), Patna	7:30-9:00 PM (Session 6)  Prof. Samir Kumar Acharya Professor  Department of Mechanical Engineering National Institute of Technology, Meghalaya	7:30-9:00 PM (Session 8)  Prof. Rajeev Agrawal  Associate Professor  Department of Mechanical  Engineering  Malaviya National Institute  of Technology (MNIT),  Jaipur	7:30-9:00 PM (Session 10)  Prof. Gajendra Kumar Adil  Professor  Shailesh J Mehta School of  Management Indian Institute of Technology  (IIT), Bombay	3:30-5:00 PM (Session 12)  Prof. Peter Ball  Professor  Operations Management  University of York,  Heslington,  United Kingdom (UK)
8:00-9:30 PM (Session 2)  Prof. Yuvraj Gajpal  Associate Professor  Asper School of Business, University of Manitoba Winnipeg, Canada					5:00-6:30 PM (Session 13)  Dr. Ayush Gautam  Assistant Professor  Department of Management  Studies  Malaviya National Institute of Technology (MNIT),  Jaipur
					6:30-8:00 PM Online Test and Feedbacks Valedictory Session

## A TOTAL OF 157 PARTICIPANTS REGISTERED FOR ONLINE ATAL -FDP 2024-25

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Mrs. Shweta Gaur	Dharmsinh Desai University	9427428343
Mrs. Heta Shashank Shah	Dharmsinh Desai University	9426422835
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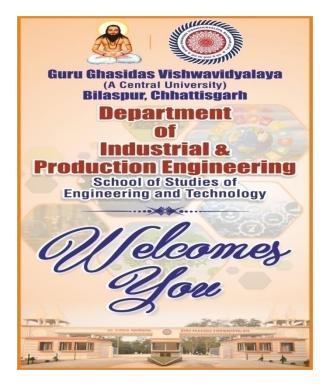
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Mrs. Rashmi Sachin Pande	PSMBS New Polytechnic	9011634774
Dr. S.Sekar	SRM Valliammai Engineering College	9566861172
Miss Rojalini Nayak	Asian School Of Technology	7978688629
Mr. Sunil Kumar L	ALLIANCE UNIVERSITY	9902991423
Dr. Namita Dixit	IILM	9560777008
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Mrs. Smarika Shah	Government Polytechnic Pipli	7505415911
Mr. Abhishek Kumar Verma	JSGEC JAGDALPUR	7587329708
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Dr. Kalaiyarasan	Muthayammal Engineering College	7639420133
Mr. Iyappan P	PSN Engineering College	9994474707
Mr. Satyajit Bhattacharjee	GURU GHASIDAS VISHWAVIDYALAYA	8130392576
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Miss Manisha Dahariya	Kirodimal Institute Of Technology Raigarh	9685159845
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Dr. Manish Oraon	School Of Studies Of Engineering And Technology	7004214283







#### **INAUGURATION CEREMONY**

The inauguration ceremony of the AICTE Sponsored ATAL-Online Faculty Development Program (FDP) organized by Department of Industrial & Production Engineering, Guru Ghasidas Vishwavidyalaya, Bilaspur on December 23, 2024, was a momentous occasion marked by the esteemed virtual presence of notable dignitaries. The Chief Guest, Hon'ble Vice Chancellor *Prof.* Alok Kumar Chakrawal, Special Guest Registrar Prof. Abhay S. Ranadive, Dean SoS E&T Prof S.C. Srivastava, Head of Dept of IPE Prof. M.K. Singh, Coordinator of ATAL-FDP Dr. Ganesh Shukla and Co-Coordinator Dr. S.C. Gajbhiye illuminated the event with their participation. The ceremony commenced at 6:00 PM in the evening through the online meeting platform WEBEX. In his inaugural address, Hon'ble Vice Chancellor Prof. Alok Kumar Chakrawal underscored the critical role of continuous learning and the faculty's pivotal contribution to shaping the future of education. He expressed optimism that the ATAL-FDP would serve as a catalyst for positive change and advancements in teaching methodologies, thereby fostering academic excellence and innovation. The Special Guest, Registrar Prof. Manish Srivastava, provided insights into the university's commitment to enhancing the skills and capabilities of its faculty members. He emphasized the strategic importance of such initiatives, aligning the university with contemporary academic trends and global standards. The presence of Dean SoS E&T Prof S.C. Srivastava and Co-Coordinator Dr. Ganesh Shukla added further gravitas to the event, signifying the collective commitment towards fostering a culture of academic excellence and research. This inauguration ceremony not only marked the beginning of the ATAL-FDP but also symbolized a significant stride towards creating a dynamic and innovative academic environment within the university, laying the foundation for future advancements and contributions to the field of industrial and production engineering.

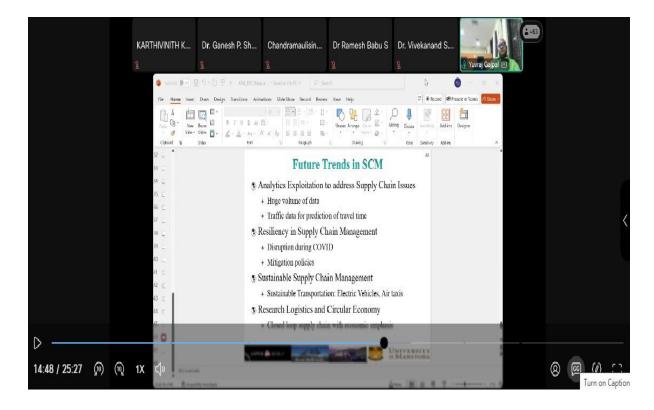


#### **Day 1 – 23rd December 2024**

It is with great pleasure that the first session of our Faculty Development Program was started around 6:30 PM on "Sustainable Supply Chain Equipped with Industry 4.0". We are privileged to have Prof. J.R. Gamage (University of Moratuwa, Sri Lanka), a distinguished expert in the field of sustainable supply chain management and Industry 4.0, virtually with us today. We look forward to gaining valuable insights from their vast experience. This program is designed to explore the intersection of sustainability and the transformative technologies associated with Industry 4.0, offering insights into how these concepts can revolutionize supply chain practices. The objective of today's session is to provide a comprehensive introduction to the integration of sustainable practices within supply chain management, with a specific focus on the innovations brought forth by Industry 4.0. We aim to familiarize our participants with the key concepts, principles, and technologies that are shaping the future of supply chain operations. Sustainable supply chain management refers to the strategic integration and coordination of environmentally and socially responsible practices throughout the supply chain. It involves making decisions that take into account the economic, social, and environmental impacts of the entire supply chain, from raw material extraction to end-of-life product disposal. Industry 4.0, also known as the Fourth Industrial Revolution, represents the integration of digital technologies into manufacturing and other industrial processes. It leverages technologies such as the Internet of Things (IoT), artificial intelligence (AI), machine learning, robotics, and data analytics to create "smart factories" and enhance overall operational efficiency.

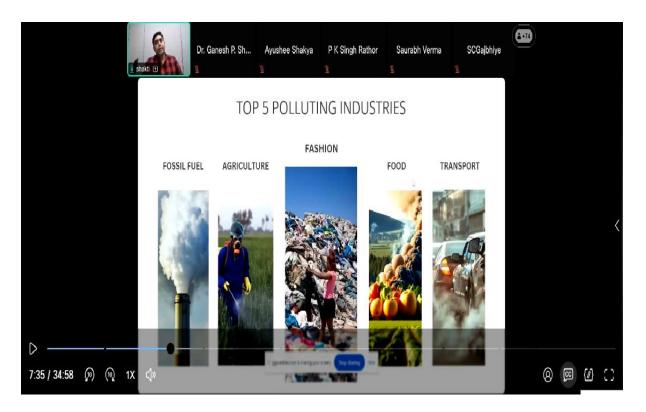


The second session was taken by *Prof. Yuvraj Gajpal (University of Manitoba, Canada)* at 8:00 PM on "Role of Industry 4.0 paradigm in supply chain sustainability development". This program is designed to explore the Industry 4.0, marked by advancements in digital technologies like the Internet of Things (IoT), Artificial Intelligence (AI), Big Data, and Blockchain, is transforming supply chain management, driving sustainability while optimizing efficiency. One critical role of Industry 4.0 in supply chain sustainability lies in enhanced transparency and traceability. Blockchain, for instance, enables real-time tracking of goods and raw materials, ensuring ethical sourcing and reducing waste. This fosters accountability, particularly in sectors where environmental and social compliance are paramount. IoT sensors and AI-powered analytics optimize resource utilization by providing insights into inventory levels, transportation routes, and energy consumption. These technologies help minimize overproduction, reduce carbon footprints, and ensure just-in-time delivery, enhancing environmental performance. Additive manufacturing (3D printing) also contributes by enabling localized production, reducing the need for extensive transportation and lowering emissions. Similarly, predictive analytics helps in foreseeing demand fluctuations, enabling proactive adjustments to supply chain operations, thereby preventing excess inventory or stock outs. Industry 4.0 also supports a circular economy model by facilitating reverse logistics for recycling and reusing products, promoting resource efficiency. Smart contracts and automated workflows further streamline processes, reducing delays and inefficiencies. By integrating these technologies, Industry 4.0 not only addresses environmental concerns but also ensures economic and operational sustainability, creating resilient supply chains.

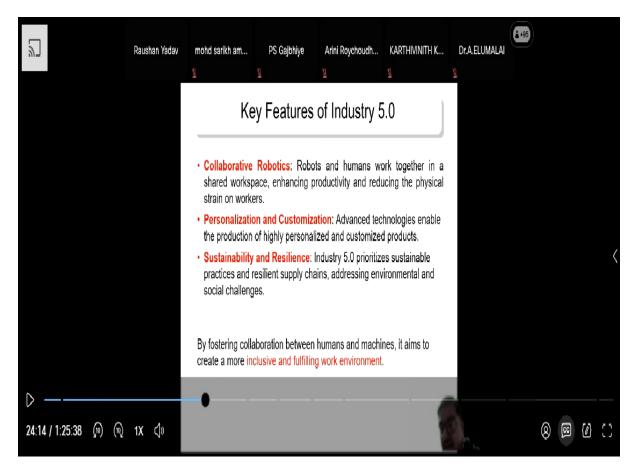


## **Day 2 - 24th December 2024**

The third session of FDP was taken by Mr. Shakti Mishra (Landmark Group, United Arab Emirates), it started at 6:00 PM on "Industry 5.0 with Technology Commercialization". So, he explained that building on the foundation of Industry 4.0, which focuses on the integration of digital technologies into manufacturing, Industry 5.0 is envisioned as the next phase in industrial development. While Industry 4.0 emphasized automation, data exchange, and smart systems, Industry 5.0 is expected to bring back a more human-centric approach by promoting collaboration between humans and advanced technologies. Industry 5.0 aims to combine the strengths of both human and machine intelligence. Instead of replacing human workers, it envisions a collaborative environment where technology enhances human capabilities and creativity. Industry 5.0 may emphasize greater customization and flexibility in manufacturing processes. This could involve the ability to rapidly adapt production lines to changing demands and preferences. The socio-economic impact of Industry 5.0 is expected to include improvements in job satisfaction, increased innovation, and a more inclusive approach to technological advancements. Industry 5.0, technology commercialization could involve bringing human-centric and collaborative technologies to market. This may include innovations that enhance the interaction between humans and machines, as well as technologies that enable more flexible and adaptable manufacturing processes. The successful integration of Industry 5.0 and technology commercialization could lead to advancements that not only benefit industries but also contribute to societal well-being and economic development.



The fourth session was taken by *Prof. Shankar Purbey (Development Management Institute, Patna)* it started around 7:30 PM on, "*Reverse Logistic Design for Remanufacturing*". He elaborated that Reverse logistics design for remanufacturing is a strategic approach to managing the flow of products and materials from the end-user back to the manufacturer for remanufacturing. Remanufacturing is a process that involves restoring used products to like-new condition, thereby extending their life cycle and reducing the environmental impact associated with manufacturing new products. Reverse logistics involves the planning, implementation, and control of the flow of goods and information from the point of consumption back to the point of origin for value recovery or proper disposal. Remanufacturing is the process of disassembling, cleaning, repairing, and restoring used or worn products to a condition that meets specific quality standards, allowing them to be reintroduced into the market. Reverse logistics design for remanufacturing is a holistic approach that integrates various processes to maximize the recovery and reuse of products. It aligns with sustainability goals, reduces waste, and contributes to a circular economy by extending the life cycle of products. Efficient reverse logistics design is essential for realizing the environmental and economic benefits of remanufacturing.



#### **DAY 3 - 25th DECEMBER 2024**

The fifth session started at 6:00 PM it was taken by Mr. Gaurav Agarwal (Grasim Industries, Aditya Birla Group) on "Industry 4.0: Transforming Supply Chains for Sustainable Development". He explained that the role of the Industry 4.0 in the development of supply chain sustainability is significant, as it introduces advanced technologies and concepts that can enhance efficiency, transparency, and environmental responsibility throughout the entire supply chain. Industry 4.0 refers to the fourth industrial revolution characterized by the integration of digital technologies, automation, data exchange, and smart systems in manufacturing and supply chain processes. Industry 4.0 technologies, such as autonomous robots and automated machinery, can streamline manufacturing and distribution processes, reducing energy consumption and waste. Industry 4.0 incorporates block-chain to create secure, transparent, and immutable records of transactions and product movements. This ensures traceability and accountability, critical for sustainable and ethical sourcing. Industry 4.0 technologies like 3D printing facilitate localized and on-demand production, reducing the need for extensive transportation and contributing to a more circular economy. Creating digital representations of physical assets (digital twins) allows for simulation and optimization of supply chain processes, fostering collaboration and innovation for sustainability goals. These technologies enhance training and skill development for workers, contributing to a more skilled and adaptable workforce. Industry 4.0 plays a pivotal role in advancing supply chain sustainability by leveraging digital technologies to optimize processes, reduce environmental impact, enhance visibility, and foster innovation. Adopting Industry 4.0 principles can lead to more resilient, efficient and sustainable supply chain practices.

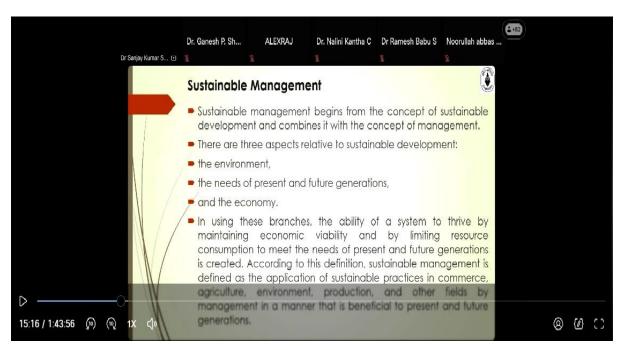


The sixth Session started at 7:30 PM it was taken by *Prof. Samir Kumar Acharya (NIT, Rourkela)* on "Green Supply Chain Management". Green Supply Chain Management (GSCM) is an approach to managing the entire supply chain with a focus on minimizing its environmental impact while maintaining economic viability and efficiency. It integrates environmental considerations into every aspect of the supply chain, from product design and manufacturing to distribution, logistics, and endof-life disposal. The goal is to achieve sustainability by reducing resource consumption, minimizing waste, lowering the overall environmental footprint of the supply chain, design of products with environmental considerations in mind, such as using eco-friendly materials and designing for recyclability, conducting a lifecycle assessment to understand the environmental impact of a product from raw material extraction to disposal. Choosing suppliers based not only on cost and quality but also on their environmental performance. Establishing partnerships with suppliers committed to sustainable practices and ethical standards, minimizing waste generation through improved production processes and lean manufacturing, promoting the recycling of materials and components, both within the organization and across the supply chain, reducing transportation-related emissions by optimizing routes, using fuel-efficient vehicles, employing alternative transportation modes, and implementing efficient inventory management to minimize the need for excess transportation and storage. Green Supply Chain Management practices, organizations can contribute to environmental conservation, enhance their corporate social responsibility (CSR) initiatives, and meet the growing demand for sustainable products and practices from environmentally conscious consumers. GSCM not only benefits the planet but also often leads to cost savings and improved long-term business resilience.



#### **DAY 4 – 26th DECEMBER 2024**

The seventh session started at 6:00 PM and was engaged by Dr. Sanjay Kumar Singh (SECL, Bishrampur) on "Project Planning and Sustainable Management for Manufacturing Industry: In the Context of Industry 4.0". Project planning and sustainable management in the manufacturing industry, within the context of Industry 4.0, involve integrating advanced technologies and sustainable practices to optimize processes, reduce environmental impact, and enhance overall efficiency. Industry 4.0, representing the fourth industrial revolution, is characterized by the convergence of digital technologies, data-driven decision-making, and smart systems. Here's how project planning and sustainable management align with Industry 4.0 principles in manufacturing. Incorporate digital technologies such as IoT (Internet of Things) sensors and devices, RFID (Radio-Frequency Identification), and industrial automation into the project plan. Ensure seamless connectivity and data exchange across the manufacturing ecosystem. Leverage connectivity for real-time monitoring of energy consumption, resource utilization, and emissions. Use data analytics to identify areas for improvement in sustainability practices. Integrate smart manufacturing principles into the project plan, including the deployment of intelligent systems, robotics, automated processes, plan for the implementation of digital twins for virtual simulations and optimizations. Automation and smart systems enhance energy efficiency, reduce waste, and improve overall resource utilization. Automated systems can be programmed to operate at optimal energy levels, contributing to sustainability goals. Industry 4.0 principles in project planning and sustainable management in the manufacturing industry, organizations can achieve a balance between economic success and environmental responsibility. This approach not only improves operational efficiency but also positions the organization as a leader in sustainable and technologically advanced manufacturing practices.



The eighth session was started around 7:30 PM and was taken by Prof. Rajeev Agrawal (MNIT, Jaipur) on "Environment, Climate Change, and Sustainability: Challenges and Way Forward". Climate change poses significant threats, including rising temperatures, extreme weather events, and sea-level rise. These changes affect ecosystems, biodiversity, and vulnerable communities. Mitigate greenhouse gas emissions through international cooperation, sustainable energy practices, and adaptation strategies for communities facing climate-related challenges. Human activities, habitat destruction, pollution, and climate change contribute to the loss of biodiversity, affecting ecosystems and the services they provide. Implement conservation measures, protect natural habitats, and promote sustainable practices to preserve biodiversity. Educate and involve communities in conservation efforts. Over-exploitation of natural resources, deforestation, and unsustainable agricultural practices deplete ecosystems and contribute to environmental degradation. Promote sustainable resource management, adopt circular economy principles, and invest in technologies that minimize resource consumption and waste. Collaborate internationally to address climate change, biodiversity loss, and other global environmental challenges. Agreements such as the Paris Agreement exemplify the importance of collective action. Invest in and promote renewable energy sources to reduce dependence on fossil fuels. Transitioning to clean energy is crucial for mitigating climate change and minimizing environmental impact. Addressing the challenges of the environment, climate change, and sustainability requires a comprehensive and collaborative approach involving governments, businesses, communities, and individuals. By implementing sustainable practices, adopting innovative technologies, and fostering global cooperation, it is possible to create a more resilient and



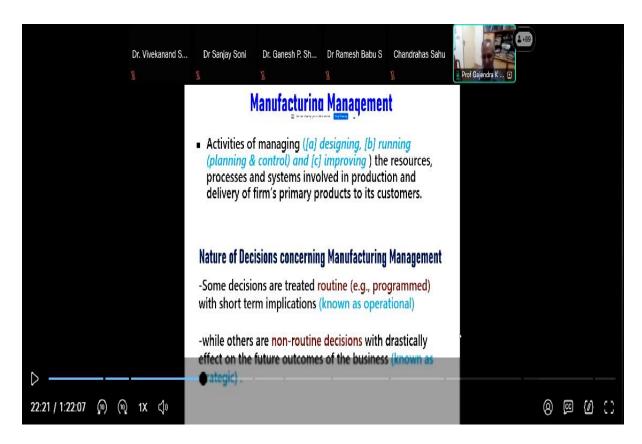
environmentally friendly future.

#### DAY 5 - 27th DECEMBER 2024

The ninth session was started around 6:00 PM and was taken by Prof. Rupesh Kumar Pati (IIM, Kozhikode) on "Innovation and Design Thinking". This session concluded that innovation and design thinking are critical drivers of progress in Industry 4.0, enabling businesses to address sustainability challenges with creative, human-centric solutions. These methodologies emphasize understanding user needs, prototyping, and iterative problem-solving, which align perfectly with the goals of sustainable development. Industry 4.0 technologies like AI, IoT, and advanced manufacturing demand innovative approaches to integrate sustainability seamlessly into operations. For instance, design thinking encourages exploring new materials, production methods, and processes that minimize environmental impact. Concepts like closed-loop systems and zero-waste manufacturing arise from such innovation-driven strategies. By adopting design thinking, companies can re-imagine supply chains to reduce carbon footprints, improve energy efficiency, and enhance product lifecycle management. For example, AI-driven predictive analytics and IoT-enabled monitoring systems help optimize energy use and resource allocation, reducing waste while maintaining productivity. Furthermore, innovation in Industry 4.0 fosters collaboration across industries, governments, and communities, driving sustainable solutions. 3D printing, a hallmark of Industry 4.0, enables localized manufacturing, reducing transportation emissions. Smart city initiatives driven by design thinking are increasingly addressing urban sustainability challenges like energy management and waste reduction. Ultimately, innovation and design thinking bridge the gap between cutting-edge technology and sustainable practices. They inspire organizations to rethink traditional business models, prioritize long-term environmental and social impacts, and create solutions that cater to evolving global demands. By embedding these principles, Industry 4.0 becomes a powerful catalyst for achieving a sustainable and inclusive future.

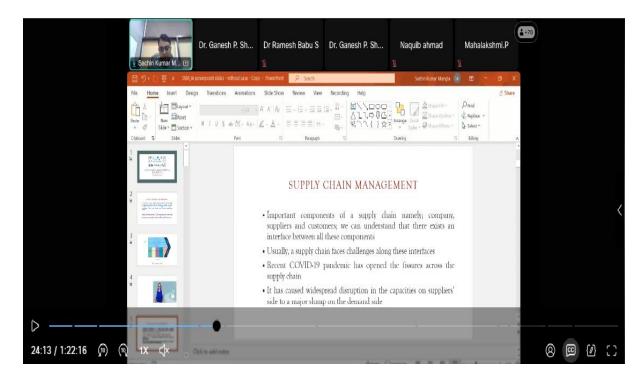


The tenth session began at 7:30 PM and was taken by *Prof. Gajendra Kumar Adil (IIT, Bombay)* on "Sustainable Manufacturing Strategies". Sustainable manufacturing strategies are approaches and practices employed by companies to integrate environmental, social, and economic considerations into their manufacturing processes. Embrace circular economy concepts, such as recycling, remanufacturing, and designing products for easy disassembly and reuse. Use environmentally friendly and responsibly sourced materials. Consider the entire life cycle of materials, from extraction to disposal, to minimize environmental impact, transition to renewable energy sources, such as solar, wind, or hydropower, to power manufacturing operations. Use environmentally friendly and responsibly sourced materials. Consider the entire life cycle of materials, from extraction to disposal, to minimize environmental impact. This reduces reliance on fossil fuels and lowers the carbon footprint of the manufacturing process. The goal is to minimize negative impacts on the environment, promote social responsibility, and ensure economic viability. These strategies align with broader sustainability goals and are often driven by a commitment to corporate social responsibility (CSR) and environmental stewardship. By integrating these sustainable manufacturing strategies, companies can contribute to environmental conservation, promote social responsibility, and build a positive brand image. Sustainable manufacturing not only aligns with global environmental goals but also often leads to cost savings, increased efficiency, and improved long-term competitiveness.



#### **DAY 6 – 28th DECEMBER 2024**

The eleventh session began at 2:00 PM and was taken by *Prof. Sachin Kumar Mangla (O.P. Jindal* Global University) on "Circular Economy and Industry 4.0: Operationalizing Sustainability in Manufacturing". The integration of Circular Economy (CE) principles with Industry 4.0 technologies is revolutionizing sustainability in manufacturing. The circular economy model focuses on reducing waste, reusing resources, and recycling materials to create a closed-loop system, contrasting the traditional linear model of "Take, Make, and Dispose". Industry 4.0, with its advanced digital technologies, offers innovative ways to operationalize these principles within manufacturing processes. Industry 4.0 technologies such as IoT, AI, Big Data, and Blockchain play a key role in enabling real-time monitoring, efficient resource management, and enhanced product lifecycle management. Through IoT sensors and AI analytics, manufacturers can track the use and performance of materials across the entire supply chain, ensuring that resources are maximized, waste is minimized, and products are designed for reuse or recycling. 3D printing is another significant innovation driven by Industry 4.0, supporting circular economy goals by enabling localized production, reducing the need for excessive transportation, and allowing for the precise use of materials. Furthermore, these technologies can facilitate reverse logistics systems, where end-of-life products are collected, disassembled, and their components are reused or remanufactured. Blockchain technology ensures transparency in the supply chain, providing traceability for recycled materials and verifying the sustainability credentials of products. By leveraging these digital solutions, manufacturers can create sustainable products that align with the circular economy while reducing their environmental impact and optimizing resource efficiency.

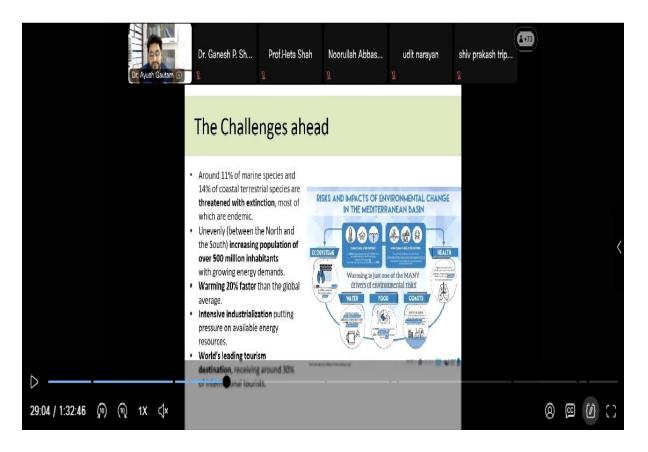


The twelfth session began at 3:30 PM and was taken by Prof. Peter Ball (University of York, United Kingdom) on "Tracking and Managing Environmental Impact through Advanced Operations Management". In today's world, businesses are increasingly held accountable for their environmental footprint. Advanced operations management (AOM), empowered by digital technologies such as AI, the IoT, and Big Data, provides powerful tools to track, measure, and manage environmental impact effectively. By integrating sustainability into their operations, businesses can improve efficiency while minimizing harm to the environment. One of the core aspects of AOM is real-time monitoring. IoT sensors placed across production processes enable businesses to collect data on energy usage, water consumption, and waste production. This data, analyzed using AI and Big Data analytics, offers insights into areas of inefficiency, highlighting opportunities for resource optimization and waste reduction. For instance, manufacturers can track energy consumption patterns and adjust operations to minimize energy waste, contributing to lower carbon emissions. Advanced operations management also involves predictive analytics, which allows companies to forecast demand and production needs accurately, reducing overproduction and excess inventory. This helps avoid unnecessary resource use and waste while maintaining operational efficiency. Furthermore, AOM fosters sustainability through supply chain transparency. Blockchain technology can track and verify the environmental credentials of products and suppliers, ensuring compliance with sustainability standards.

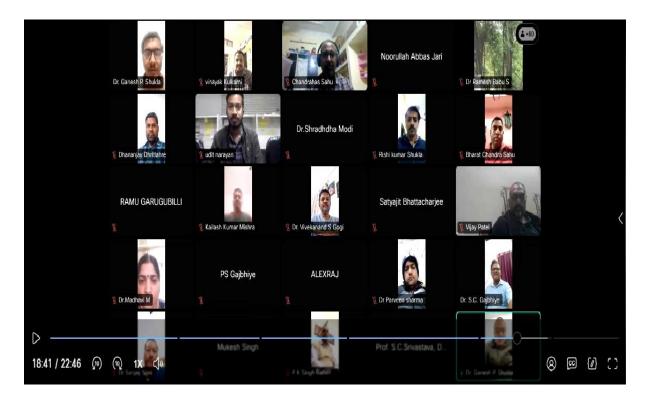


The last session of this Online FDP began at 5:00 PM and was taken by *Dr. Ayush Kumar Gautam* (*MNIT, Jaipur*) on "*Resilience and Sustainability in Global Manufacturing Operations*". In this interconnected world, global manufacturing operations must balance resilience and sustainability to

remain competitive and address increasing environmental and societal demands. Resilience in manufacturing refers to the ability of businesses to withstand and adapt to disruptions, whether they be economic shifts, supply chain challenges, or natural disasters, while sustainability focuses on minimizing environmental impacts and ensuring long-term resource viability. Global supply chains, increasingly susceptible to disruptions due to factors like pandemics, geopolitical conflicts, and climate change, require resilient manufacturing strategies. By embracing digital technologies such as AI, the IoT, and Big Data, manufacturers can improve supply chain visibility, predict potential disruptions, and swiftly adapt production processes. AI-powered analytics can help companies optimize inventory, production schedules, and resource allocation to mitigate risks caused by uncertainty or external shocks. Sustainability, meanwhile, is becoming a core component of operational strategies. Manufacturing companies are integrating eco-friendly practices such as energyefficient production, waste reduction, and the use of sustainable materials to reduce their environmental footprint. Manufacturing operations that are both flexible and sustainable can better navigate changing regulations and market demands, while simultaneously meeting consumer expectations for environmentally responsible products. A test was also conducted for half-an hour for the participants on this last day, consisting of multiple choice questions (MCQs) of 30 marks. The test paper consisted of questions from the sessions taken by the resource persons during this completed ATAL-FDP.



#### **VALEDICTORY FUNCTION**



The valedictory function of this Online Faculty Development Program (FDP) is a pivotal event, signifying the conclusion of a transformative period characterized by intense learning and personal growth. The ceremony, graced by distinguished guests such as Dean SoS E&T *Prof S.C. Srivastava*, Head of Dept of IPE Prof. M.K. Singh, Coordinator of ATAL-FDP Dr. Ganesh Shukla and Co-Coordinator Dr. S.C. Gajbhiye. The event unfolds with a warm virtual welcome and expressions of gratitude by the host, underscoring the FDP's objectives and accomplishments. Coordinator of ATAL-FDP Dr. Ganesh Shukla extends a gracious welcome, setting the tone for an atmosphere of appreciation and collaboration among the attendees. Prof. S.C. Srivastava, the Dean SoS E&T at GGV and HOD (IPE) Prof. M.K. Singh contribute profound insights into the critical aspects of faculty development, reflecting on the program's impact and illuminating emerging trends in education. This enriching discourse provides participants with a platform to articulate their reflections, fostering a collaborative and interactive atmosphere that encourages the exchange of ideas. The culmination of the valedictory function involves a significant moment—the presentation of appreciation certificates to acknowledge and celebrate the successful completion of the FDP. Co-Coordinator Dr. S.C. Gaibhiye takes the opportunity to express gratitude to the organizers, trainers, resource persons, and support staff. This recognition underscores their pivotal role in the seamless planning and execution of the FDP, highlighting the collective dedication that has elevated the academic community's capabilities. In essence, the valedictory function serves as a tangible manifestation of the commitment to continuous learning, collaboration, and excellence within the academic realm.

#### **ACKNOWLEDGEMENT**

The initiative undertaken by the ATAL Academy is commendable, and the individual expressing gratitude reflects on the positive outcomes of this endeavour. The department of IPE, GGV expresses deep appreciation for the initiative, emphasizing the positive impact it had on their professional journey. The acknowledgment of the opportunity granted by the All India Council for Technical Education (AICTE) to conduct an online Faculty Development Program (FDP) for participants of technical institutes in India at no cost underscores the significance of accessible professional development. The department of IPE, GGV expresses gratitude for the opportunity to contribute to the enhancement of the skills and knowledge of fellow educators. The phrase "huge response for registration" indicates the widespread interest and eagerness among participants to participate in the FDP, underscoring the relevance and timeliness of the program. Furthermore, the receipt of numerous compliments for the organization of the online FDP is a testament to the effectiveness and impact of the initiative. The positive feedback suggests that the FDP successfully met the expectations of the participants, providing valuable insights, relevant information, and practical skills that resonate with the needs of participants in technical institutes. In summary, the department of IPE, GGV expresses gratitude for the great initiative by ATAL Academy and the opportunity provided by AICTE to conduct an online FDP for participants. The positive response in terms of registration and compliments reflects the initiative's success in meeting the professional development needs of technical educators and highlights the importance of such accessible and well-executed programs in the education sector.

### **COORDINATOR & CO-COORDINATOR**

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