

**Report on**  
**Faculty Development Programme (FDP)**  
**on**  
**Futuristic Trends in Clean Energy and Manufacturing**  
**Technologies**  
**Harcourt Butler Technical University, Kanpur**  
**December 30, 2024 – January 04, 2025**

### **Introduction**

In the current global scenario, rapid industrialization and increasing energy demand have raised serious concerns regarding environmental sustainability, climate change, and depletion of conventional energy resources. Clean energy technologies and sustainable manufacturing practices have emerged as critical solutions to address these challenges. Recognizing the need to update and strengthen the knowledge base of academicians, researchers, and industry professionals, the Human Resource Development Cell (HRDC) of Harcourt Butler Technical University (HBTU), Kanpur organized a Faculty Development Programme (FDP) titled “Futuristic Trends in Clean Energy and Manufacturing Technologies.”

### **Objectives of the FDP**

The main objectives were to develop an understanding of clean energy technologies, explore renewable energy integration, reduce carbon footprints, and introduce cutting-edge research in sustainable manufacturing. The Faculty Development Programme on Futuristic Trends in Clean Energy and Manufacturing Technologies was designed with the following key objectives:

1. To develop a comprehensive understanding of clean and renewable energy technologies and their relevance to modern manufacturing industries.
2. To explore the integration of renewable energy sources and energy-efficient systems into industrial and manufacturing processes.
3. To highlight the role of clean energy solutions in reducing carbon footprint and promoting sustainable industrial practices.
4. To introduce participants to cutting-edge research, recent advancements, real-world case studies, and industrial applications in clean energy and sustainable manufacturing.

### **Participants and Programme Structure**

The FDP was open to a wide range of participants, including:

1. Faculty members from engineering, science, and technology disciplines
2. Research scholars working in the areas of renewable energy, sustainability, and advanced manufacturing
3. Industry professionals interested in clean energy adoption and sustainable manufacturing technologies

Participation in the programme was free of cost, ensuring accessibility and encouraging large-scale academic and professional engagement. The programme was conducted in online mode through Google Meet, making it convenient for participants from different regions to attend.

The FDP spanned six days, with multiple technical sessions scheduled each day. Each session was delivered by an expert speaker and focused on a specific theme related to clean energy, advanced manufacturing, or sustainability.

## **Technical Sessions and Thematic Coverage**

The FDP featured a well-structured schedule covering a diverse range of topics. The sessions provided both theoretical insights and practical perspectives on futuristic trends in clean energy and manufacturing.

### **Clean Energy Technologies**

Several sessions focused on emerging clean energy solutions such as fuel cell technologies, solar energy systems, hydrokinetic energy, gravity-based energy storage, and waste-to-energy concepts. Topics such as fuel cell integration strategies, solar-based essential oil extraction, and floating photovoltaic systems highlighted innovative approaches toward renewable energy utilization.

Participants gained insights into how these technologies contribute to energy efficiency, reduced emissions, and sustainable development. Real-world applications and case studies helped bridge the gap between theory and practice.

### **Sustainable Fuels and Energy Storage**

The FDP also addressed sustainable fuel alternatives, including nano-blended biodiesel and waste plastic-derived oils as potential automotive fuels. These sessions emphasized the importance of alternative fuels in reducing dependence on fossil fuels and minimizing environmental pollution.

Energy storage technologies, such as gravity storage systems and smart energy management in buildings, were discussed in detail, highlighting their role in stabilizing renewable energy supply and enhancing grid reliability.

### **Advanced Manufacturing and Materials**

Manufacturing technologies aligned with sustainability were another major focus area. Sessions on metal additive manufacturing, surface texturing, micro- and nanofabrication, and nanotechnology-based applications demonstrated how advanced manufacturing can improve material efficiency, product performance, and environmental sustainability.

These sessions showcased how clean energy and manufacturing technologies are increasingly interconnected, enabling the development of high-value, low-impact industrial solutions.

### **Energy Informatics and Smart Systems**

Emerging concepts such as energy informatics, smart power systems, and intelligent building technologies were also discussed. These sessions highlighted the role of data analytics,

digitalization, and smart control systems in improving energy efficiency and sustainability across industrial and urban infrastructures.

## Resource Persons and Expertise

One of the key strengths of the FDP was the participation of eminent speakers from prestigious institutions in India and abroad. Experts from IIT Indore, DTU Delhi, IIIT Jabalpur, NIT Srinagar, NSUT Delhi, Lund University (Sweden), BITS Pilani, and international universities shared their expertise.

The diverse academic and industrial backgrounds of the speakers enriched the learning experience and provided participants with global perspectives on clean energy and manufacturing trends.

## Resource Persons Information

S. No.	Name	Address	Topic of Presentation
1	Dr. Tushar Chaudhary	Department of Mechanical Engineering, Indian Institute of Information Technology Design & Manufacturing Jabalpur, Madhya Pradesh	Fuel Cell Technology and its Integration Strategies: A Sustainable Approach Towards hybridization
2	Dr. VSKV Harish	Department of Electrical Engineering, NSUT Delhi	Transition Towards Cleaner Energy Systems through Smart Buildings
3	Prof. Anil Kumar	Department of Mechanical Engineering, Delhi Technical University Delhi	Real Challenges: Renewable Energy: Global & Indian Renewable Energy Scenario
4	Dr. Krishna Kumar	Department of Water Resources Engineering & Centre for Advanced Middle Eastern Studies Lund University, Sweden	Energy Informatics: Transforming Power Systems for Efficiency and Sustainability
5	Dr. Harveer Singh Pali	Department of Mechanical Engineering, National Institute of Technology Srinagar, J&K	Waste Plastic Derived Oil as Sustainable Automotive Fuel
6	Dr. Abhishek Sharma	Department of Mechanical Engineering, Loknayak Jai Prakash Institute of Technology Chapra, Bihar	Nanotechnology for Sustainability Fuels: The Case of Nano-Blended Biodiesel
7	Dr. Mayank Verma	IIHR — Hydrosience & Engineering, The University of Iowa, United States	Tapping Clean Energy from Vortex-Induced Vibrations

8	Ms. Swati Maini	Maini Renewables, Mumbai	Hydrokinetic Energy: Innovative Energy Solutions for a Sustainable Future
9	Mr.Dishant Mishra	Baud Resources, Delhi	Application of Gravity Storage Technology in the Indian Renewable Energy Market Emerging
10	Dr. Manish Kumar	Department of Electronics and Communication Engineering, Himachal Pradesh University (HPU) Shimla	Emerging Solar PV Technologies – FPV Systems
11	Dr. Girish Chandra Verma	Department of Mechanical Engineering, Indian Institute of Technology Indore	Hybrid Additive Manufacturing System
12	Dr. Avinash Kumar	Department of Mechanical Engineering, Indian Institute of Information Technology Design & Manufacturing Kancheepuram, Chennai	Textured Surfaces and Surface Modification with Application to Sustainability
13	Dr. Geeta Bhatt	Department of Mechanical Engineering, BITS Pilani	Micro/Nanofabrication for Drug Delivery

## Assessment and Certification

An assessment test was conducted on the final day of the FDP to evaluate participants' understanding of the topics covered. Certificates of participation were awarded to those who completed the assessment and attended all the sessions. This evaluation mechanism ensured active engagement and reinforced learning outcomes.

## Summary

The Faculty Development Programme on Futuristic Trends in Clean Energy and Manufacturing Technologies, organized by the HRDC of Harcourt Butler Technical University, Kanpur was a highly informative and impactful academic initiative. By bringing together experts, educators, researchers, and professionals, the FDP created a valuable platform for knowledge exchange and capacity building.

The programme emphasized the urgent need for clean energy adoption and sustainable manufacturing to achieve long-term environmental and economic sustainability. Overall, the FDP contributed significantly to professional development and reinforced the role of academia and industry in shaping a cleaner and more sustainable future.

# प्लास्टिक कचरे से जैव ईंधन के निर्माण पर दिया जोर

जासं, कानपुर : हरकोर्ट बटलर प्रौद्योगिकी विश्वविद्यालय (एचबीटीयू) के मानव संसाधन विकास प्रकोष्ठ की ओर से आयोजित छह दिवसीय फैकल्टी डेवलपमेंट प्रोग्राम (एफडीपी) में शामिल विशेषज्ञों ने प्लास्टिक कचरे से जैव ईंधन निर्माण को बढ़ावा देने की जरूरत पर जोर दिया। समापन समारोह के मुख्य अतिथि और विश्वविद्यालय के प्रति कुलपति प्रो. दीपक परमार ने कहा कि स्वच्छ ऊर्जा और सतत विकास आज के समय की आवश्यकता है।

एफडीपी कार्यक्रम में स्वच्छ ऊर्जा और विनिर्माण प्रौद्योगिकियों के भविष्य के रुझान पर प्रशिक्षण सत्रों का आयोजन किया गया। संयोजक, प्रो. संजीव कुमार ने बताया कि इस एफडीपी में ऊर्जा प्रबंधन, स्वच्छ ऊर्जा समाधान, हरित भवन, ऊर्जा संग्रहण प्रौद्योगिकियों, और उन्नत विनिर्माण तकनीकों पर विशेषज्ञों



एचबीटीयू • जगरण आर्काइव

के व्याख्यान कराए गए। कुल 254 प्रतिभागियों ने इसमें हिस्सा लिया है। स्वीडन के लुंड विश्वविद्यालय के डा. कृष्णा कुमार ने ऊर्जा सूचना विज्ञान और इसकी स्थिरता पर प्रभाव और एनआइटी श्रीनगर के प्रोफेसर डा. एचएस पाली ने प्लास्टिक अपशिष्ट से जैव-ईंधन उत्पादित करने की विधियों पर जानकारी दी। कार्यक्रम को आर्डिनेटर डा. गौरव और डा. ऋषिकान्त ने सभी का धन्यवाद किया।

## एचबीटीयू में साफ्टवेयर प्रशिक्षण का शुभारंभ

जगरण संग्रहालय, कानपुर : हरकोर्ट बटलर प्राविधिक विश्वविद्यालय के टैगोर केन्द्रीय पुस्तकालय में शनिवार को दो दिवसीय कोहा साफ्टवेयर का प्रशिक्षण शुरू किया गया है। कार्यक्रम का उद्घाटन विश्वविद्यालय के कुलपति प्रो. समशेर ने किया। उन्होंने केन्द्रीय पुस्तकालय का अधिक से अधिक प्रयोग करने के लिए विश्वविद्यालय के शिक्षकों और छात्रों को प्रोत्साहित किया। उन्होंने कहा कि केन्द्रीय पुस्तकालय का लाभ लें। इस अवसर पर लाइब्रेरी के वेब पेज की भी शुरुआत की गई।

विश्वविद्यालय के केन्द्रीय पुस्तकालय के अध्यक्ष डा. प्रमोद कुमार शर्मा ने कोहा आटोमेशन साफ्टवेयर की विशेषताओं के बारे में विस्तार से बताया। विजय सिंह ने इस दौरान ई-लिबसोल की मदद से साफ्टवेयर का प्रशिक्षण पुस्तकालय स्टाफ को प्रदान किया। इस अवसर पर प्रो. रघुराज सिंह, प्रो. अनीता यादव, प्रो. वन्दना दीक्षित कौशिक, और प्रो. प्रभात वर्मा विशेष रूप से मौजूद रहे।

## एचबीटीयू : स्वच्छ ऊर्जा समाधानों पर रखे विचार

कानपुर। हरकोर्ट बटलर तकनीकी विवि में स्वच्छ ऊर्जा और निर्माण प्रौद्योगिकियों में भविष्य की प्रवृत्तियां विषय पर संकाय विकास कार्यक्रम सोमवार को शुरू हुआ। एक सप्ताह के कार्यक्रम में इंजीनियरिंग और विज्ञान संकायों के सदस्य को मिलाकर कुल 254 प्रतिभागी शामिल हुए। शुभारंभ कुलपति प्रो. समशेर ने किया।

एचआरडी सेल की ओर से आयोजित कार्यक्रम में आईआईटी, एनआईटी, आईआईआईटी, बिट्स पिलानी और अंतरराष्ट्रीय विश्वविद्यालयों से आए शिक्षाविद व्याख्यान देंगे। पहले दिन आईआईआईटी जबलपुर के डॉ. तुषार चौधरी ने ईंधन सेल प्रौद्योगिकी और हाइब्रिडीकरण के लिए रणनीतियां, एनआईटी श्रीनगर से आए डॉ. एचएस पाली ने प्लास्टिक अपशिष्ट से प्राप्त ऑटोमोटिव ईंधन पर विचार रखे।

लोक नायक जयप्रकाश प्रौद्योगिकी संस्थान बिहार के डॉ. अभिषेक शर्मा ने नैनो प्रौद्योगिकी के माध्यम से स्थायी ईंधन और हिमाचल प्रदेश विवि के डॉ. मनीष कुमार ने फ्लोटिंग सोलर पीवी सिस्टम विषय पर विचार व्यक्त किए। कार्यक्रम में कॉर्डिनेटर डॉ. गौरव सैनी, सह-कॉर्डिनेटर डॉ. निशांत कुमार सिंह, डॉ. ऋषि कांत शामिल रहे। संचालन कनिका पांडे एवं उन्नति ने किया। (ब्यूरो)

### About HBTU, Kanpur

Harcourt Butler Technical University, Kanpur (Formerly HBTI, Kanpur) was established in 1921 and has a glorious history and has always been in the forefront for technological developments and growth of industries in the country since its inception. The Institute had its decent beginning as Government Technological Institute, Uttar Pradesh in 1921 with Dr. E. R. Watson as its first Principal. The Institute was renamed as Harcourt Butler Technological Institute in 1926 in the honor of name of Sir Spencer Harcourt Butler, the then Governor of U. P. Degree courses in Oil Technology and Chemical Engineering were started in 1954 and thereafter number of undergraduate and post graduate courses were started. On March 26, 1965, it was upgraded from a Government Department status to an autonomous Institution. It was upgraded as Harcourt Butler Technical University, Kanpur on September 01, 2016 by Govt. of UP. University spreads across two campuses - East Campus (77 acres) and West Campus (271 acres) situated approximately 3.5 kilometers apart.

### About HRD Cell

Harcourt Butler Technical University established Human Resource

Development Cell (HRDC) for smooth conduction of FDP, Training Programme, Seminar, Expert Lecture, Symposium etc.. HRDC is focused on the crucial development of quality ensured delivery of education to continuous knowledge upgradation, capacity building and motivation of teachers for accepting challenges arising from new research and advancement in technology and recent trends of breaking barriers of subject related to engineering, technology and management.

### About FDP

Faculty development program (FDP) is a tool for fostering knowledge and professional skills of faculty members in order to improve their performance in education, research and administration as well as augmenting organizational capacities and culture. HRD Cell of Harcourt Butler Technical University, Kanpur is organizing a Faculty Development Programme in Online mode on “**Clean Energy and Manufacturing Technologies**” from **Dec. 30, 2024 to Jan. 04, 2025**. FDP is open for Faculty members working in various Engineering and Science disciplines, Research Scholars focusing on renewable energy, sustainability, and manufacturing processes and Industry professionals who are interested in exploring clean energy solutions by adopting the latest developments in manufacturing Industries. The speakers are joining from different International organizations/Universities/IITs/IIITs,/NITs/Central

/State universities. The beneficiaries of the FDP are expected to adopt the following outcomes:

- ❖ Understand the state-of-the-art clean energy solutions and practical applications through sustainable manufacturing.
- ❖ Understand the role of new technologies in reducing the environmental impact through the complete lifecycle.
- ❖ Be familiar with sustainable energy policies, green manufacturing practices, and future energy and manufacturing integration trends.

### Objectives of the FDP

The FDP is envisioned to attain the following objectives:

- ❖ To inculcate a comprehensive understanding of clean energy technologies and their impact on manufacturing industries.
- ❖ To explore renewable energy sources, energy efficiency, and their integration into manufacturing systems.
- ❖ To discuss the role of clean energy in reducing carbon footprints and enhancing sustainability in industrial practices.
- ❖ To introduce participants to cutting-edge research, case studies, and real-world applications of clean energy technologies in manufacturing.

## Registration Process

Participation in FDP is free of cost and therefore, **no registration fee** is required to participate in this event. The last date of registration is **28.12.2024**. The registration has to be done using the **Link/QR** Code given below. Pre-registration and joining to WhatsApp group is mandatory to get the Online FDP Google Meet Link.

For Online Registration Click the Link  
<https://forms.gle/BEfvowJu5Y6vEEaY9>



For Information Join Below WhatsApp Group  
<https://chat.whatsapp.com/GUA0ZKjc1sg2LBe1YEQFQw>

**NOTE:** On the last day of the programme an assessment test may be conducted for all participants. Certificate of Participation will be provided upon successful completion of assessment test and attending all the sessions.

## Organizing Committee

- Patron** : Prof. Prof. Samsher  
Hon'ble Vice Chancellor  
HBTU, Kanpur
- Convener** : Prof. Sanjiv Kumar  
Coordinator HRD Cell  
HBTU, Kanpur
- Coordinator** : Dr. Gaurav Saini  
Assistant Professor  
MED, HBTU Kanpur
- Co-Coordinator** : Dr. Nishant Kumar Singh  
Associate Professor  
MED, HBTU Kanpur
- Dr. Rishi Kant  
Assistant Professor  
MED, HBTU Kanpur

Please send your queries to:

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## Faculty Development Programme

On

**Futuristic Trends in Clean Energy and  
Manufacturing Technologies**

**Dec. 30, 2024 – Jan. 04, 2025**



**Organized by:**

**Human Resource Development Cell  
(HRDC)**

**Harcourt Butler Technical University  
Kanpur (U.P.) – 208002  
(Website: [www.hbtu.ac.in](http://www.hbtu.ac.in))**

# Schedule : Faculty Development Program (FDP)

## “Futuristic Trends in Clean Energy and Manufacturing Technologies”

(Dec. 30, 2024 - Jan 04, 2025)

**Organized By :** Human Resource and Development Cell, Harcourt Butler Technical University, Kanpur, U.P., India

Day-Date Time	Monday 30.12.2024	Tuesday 31.12.2024	Wednesday 01.01.2025	Thursday 02.01.2025	Friday 03.01.2025	Saturday 04.01.2025
10:30 AM to 11:00 AM	<b>Inaugural Session</b>	<b>Participants Joining in Online Google Meet</b>				
11:00 AM to 11:45 PM	Fuel Cell Technology and its Integration Strategies: A Sustainable Approach towards Hybridization (TC)	Advancement in Solar Energy-Based Essential Oil Extraction Systems (AK)	Waste Plastic Derived Oil as Sustainable Automotive Fuel (HSP)	Taping Clean Energy from Vortex-Induced Vibrations (MV)	Metal Additive Manufacturing for High-Value Applications (GCV)	Textured Surfaces and Surface Modification with Application to Sustainability (AVK)
11:45 PM to 12:15 PM				Hydrokinetic Energy: Innovative Energy Solutions for a Sustainable Future(SM)		
12:15 PM to 02:30 PM	<b>Break</b>					<b>Valedictory Session</b>
02:30 PM to 3:15 PM	Transition towards cleaner energy system through Smart Buildings (VSKV)	Energy Informatics: Transforming Power Systems for Efficiency and Sustainability (KK)	Nanotechnology for Sustainable Fuels: The Case of Nano-Blended Biodiesel (AS)	Application of Gravity Storage Technology in the Indian Renewable Energy Market (DS)	Micro/Nanofabrication for Drug Delivery (GB)	
3:15 PM to 3:45 PM				Emerging Solar PV Technologies-Floating PV Systems (MK)		

TC : Dr. Tushar Chaudhary Dept. of Mechanical Engineering, IIIT Jabalpur	AK : Prof. Anil Kumar Dept. of Mechanical Engineering, DTU Delhi	HSP : Dr. H S Pali Dept. of Mechanical Engineering, NIT Srinagar, J&K	MV : Dr. Mayank Verma University of Iowa, United States	GCV : Dr. G.C. Verma Dept. of Mechanical Engineering, IIT Indore	AVK : Dr. Avinash Kumar Dept. of Mechanical Engineering, IIITDM Kancheepuram Chennai
VSKV : Dr. VSKV Harish Dept. of Electrical Engineering, NSUT Delhi	KK : Dr. Krishna Kumar Lund University Sweden	AS : Dr. Abhishek Sharma Dept. of Mechanical Engineering, Lok Nayak Jai Prakash Institute of Technology, Chapra, Bihar	DS : Mr. Dishant Mishra Baud Resources, Delhi	MK : Dr. Manish Kumar Dept. of Electronic and Communication Engineering, Himachal Pradesh University Shimla	GB : Dr. Geeta Bhatt Dept. of Mechanical Engineering, BITS Pilani
	SM : Ms. Swati Maini, Maini Renewables Mumbai				

**FDP Coordinator :** Dr. Gaurav Saini, Assistant Professor, MED, HBTU Kanpur  
**Co-Coordinator :** Dr. N.K. Singh, Associate Professor, MED, HBTU Kanpur  
 Dr. Rishi Kant, Assistant Professor, MED, HBTU Kanpur

**FDP Convener :** Prof. Sanjiv Kumar, Coordinator HRD Cell