



**CENTRE OF EXCELLENCE**  
**Socio-Environmental Sustainability for River Sand - Mining**  
**SEnSRS**

# NEWSLETTER

**VOLUME 1 EDITION 2**

**OCTOBER - DECEMBER 2025**



**CLIMATE-RESILIENT HYDROLOGY AND CRYOSPHERE RESEARCH**



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## About SEnSRS IIT Ropar



Sensrs is a Centre of Excellence at IIT Ropar focused on socio-environmental sustainability for river sand-mining regions. It integrates remote sensing, geospatial analysis, field studies, and policy support to enable evidence-based monitoring, ecological protection, and responsible resource governance.



**Prof. (Dr.) Rajeev Ahuja**

Director  
IIT Ropar, Punjab

### A message from the Director, IIT Ropar

It gives me immense pleasure to present the **SEnSRS Newsletter (October–December 2025)**, showcasing the academic, research, and capacity-building initiatives of the **Centre of Excellence for Socio-Environmental Sustainability for River Sand Mining (SEnSRS)**, IIT Ropar.

During this quarter, the Centre successfully organized the **19th Project Advisory and Monitoring Committee (PAMC) Meeting on Hydrology and Cryosphere**, facilitating meaningful discussions on climate-resilient hydrology, glacier and snow processes, groundwater–surface water interactions, and the use of advanced tools such as AI and remote sensing for sustainable water management.

SEnSRS also demonstrated a strong commitment to **skill development and emerging technologies** through the **AICTE-supported Drone Training Programme**, providing hands-on exposure to drone assembly, flying, and certification. In addition, the **Faculty Development Programme on Drone Technologies and Intelligent Systems** strengthened academic capacity by integrating AI, IoT, and aerial platforms into teaching and research.

The **field visit to Prashar Lake** further enriched experiential learning by linking scientific understanding with ecological and cultural perspectives. I commend the SEnSRS team for their dedicated efforts and wish them continued success in advancing sustainable, science-driven solutions.

Best Regards,  
Prof. (Dr.) Rajeev Ahuja





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### Dr. Reet Kamal Tiwari

Head & Associate Professor  
Department of Civil Engineering  
Centre Coordinator, SEnSRS  
IIT Ropar, Punjab

As we conclude the final quarter of 2025, I am happy to reflect on a phase of **active learning, collaboration, and capability building** at the Centre of Excellence for Socio-Environmental Sustainability for River Sand Mining (**SEnSRS**), IIT Ropar.

This period was defined by **hands-on engagement and knowledge exchange**. Our focus extended beyond research discussions to strengthening technical competencies and real-world understanding. The **AICTE-supported drone training and certification programme** empowered participants with practical UAV skills, while the **Faculty Development Programme on Drone Technologies and Intelligent Systems** created an interactive platform for faculty to explore AI-enabled aerial applications and data workflows.

Equally significant was the field visit to Prashar Lake, which offered an immersive experience in observing hydrological systems, geomorphology, and ecological processes within a natural and cultural landscape. Such field-based learning remains central to our approach of connecting theory with practice.

These activities reflect SEnSRS's emphasis on **capacity building, experiential learning, and interdisciplinary exposure**. I sincerely appreciate the enthusiasm of participants and the dedication of our team. We look forward to expanding these efforts and nurturing innovation, skills, and sustainability-driven research in the coming months.

Best Regards,  
Dr. Reet Kamal Tiwari



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### Dr. Sartajvir Singh Dhillon

Chief Scientific Officer,  
Centre of Excellence, SEnSRS  
Socio-Environmental Sustainability in River Sand Mining  
IIT Ropar, Punjab

The October–December 2025 period has been an energizing phase of **technical advancement and applied learning** at **SEnSRS, IIT Ropar**. Our focus during this quarter was to strengthen the **science–technology interface**, ensuring that research, training, and field activities directly contribute to practical and scalable outcomes.

A major emphasis was placed on **technology–driven capacity building**, particularly through the AICTE-supported drone training and certification programme, where participants gained hands-on experience in UAV assembly, flight operations, and data acquisition. In parallel, the Faculty Development Programme on Drone Technologies and Intelligent Systems explored the integration of **AI, ML, and IoT with aerial platforms**, highlighting data pre-processing, post-processing, and intelligent analytics for real-world applications.

While technical training remained central, experiential exposure through the Prashar Lake field visit enabled participants to observe hydrological and geomorphological processes in a natural setting, reinforcing the value of field validation alongside digital and analytical tools.

These initiatives reflect our commitment to **applied research, skill-oriented learning, and technological innovation**. I appreciate the efforts of the SEnSRS team and collaborators in delivering these programmes and look forward to further advancing impactful, technology-led solutions for environmental sustainability.

Best Regards,  
Dr. Sartajvir Singh Dhillon





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## 19th PAMC Meeting on Hydrology and Cryosphere Day 1 | October 27, 2025

➤ **Day 1** focused on **ongoing projects** exploring cloud microphysics, isotope hydrology, debris-covered glaciers, and regional hydrological evolution. New project proposals emphasized **basin-scale hydrological modeling**, integration of **machine learning with hydrodynamics**, digital twins for water management, and groundwater-surface water assessments. Presentations highlighted **floodplain dynamics, catchment-scale water management, and snowpack optimization** for climate resilience.





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## 19th PAMC Meeting on Hydrology and Cryosphere

### Day 2 | October 28, 2025



Day 2 centered on **glacier, snow, and permafrost processes**. Key discussions included **permafrost modeling**, glacier delineation using AI, seismic monitoring of glaciers and glacial lakes, and snow-glacier hydrology under climate change. Integrated approaches combining **remote sensing, in-situ measurements, and AI-based modeling** were presented to enhance **hazard assessment, water resource sustainability, and climate adaptation**.



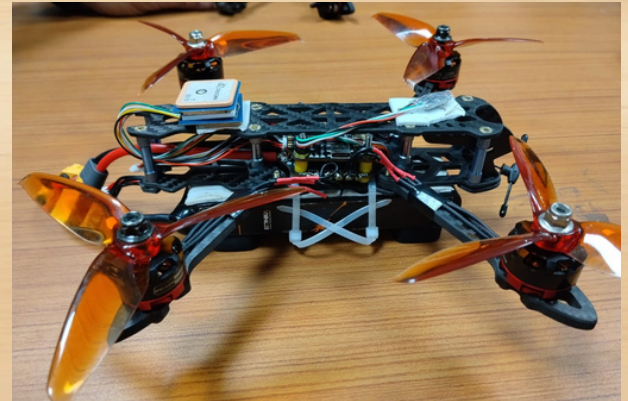


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## **AICTE QIP PG Drone Training Programme**

### **5 December 2025**



In December 2025, AICTE conducted a hands-on training programme on **Dismantling, Assembling, and Drone Flying** to strengthen practical skills and capacity building in emerging UAV technologies. The programme provided participants with in-depth exposure to **drone hardware components**, their assembly and dismantling processes, and the fundamentals of flight control systems.

Through guided practical sessions, participants learned about **safety protocols, calibration, basic maintenance, and real-time flight operations**, gaining a clear understanding of how drones are deployed for applications such as **surveying, mapping, environmental monitoring, and data collection**. The training emphasized experiential learning, enabling participants to bridge the gap between theoretical knowledge and real-world drone operations.

This initiative reflects AICTE's continued commitment to **skill development, technological innovation, and experiential education**, equipping students and researchers with industry-relevant competencies in unmanned aerial systems.







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### Certification Awarding Session 11 December 2025



A hands-on training programme on “Dismantling & Assembling of Drones and Drone Flying” was conducted in December 2025 with **AICTE support**. The programme provided participants with practical exposure to drone components, assembly techniques, safety protocols, and live flying sessions. Participants gained essential skills in drone operation and real-world applications. **Certificates were awarded to all successful candidates**, recognizing their participation and skill development in UAV technology.







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### Field Visit to Prashar Lake 12 December 2025

As part of an academic and experiential learning initiative, participants undertook a **field visit to Prashar Lake**, a renowned high-altitude freshwater lake in Himachal Pradesh. The visit provided an opportunity to observe the **natural geomorphology, hydrological features, and ecological setting** of the lake and its surrounding landscape.

The visit also encouraged appreciation of **cultural heritage**, with discussions on the historical significance of the Prashar Rishi Temple and the role of local traditions in environmental stewardship.

Overall, the Prashar Lake visit enriched learning, fostering **environmental awareness, interdisciplinary understanding, and experiential engagement with nature**.





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### Integration with GIS, AI & Remote Sensing

- GIS-based spatial analysis
- AI/ML for pattern detection & prediction
- Satellite + Drone data fusion
- Automated reporting dashboards
- **Outcome:** Smarter decision-making & early warning systems

DL

Person recognition

Car recognition

Package recognition

Face recognition

### Drones in River Sand Mining

**Key Applications**

- Identification of legal & illegal mining
- Volume estimation of extracted sand
- River morphology & channel shift analysis
- Monitoring of buffer zones & no-mining areas
- Replenishment studies

**Benefits**

- Transparency in mining operations
- Supports DSR, EC & EMGSM compliance

## Faculty Development Programme on Drone Technologies and Intelligent Systems

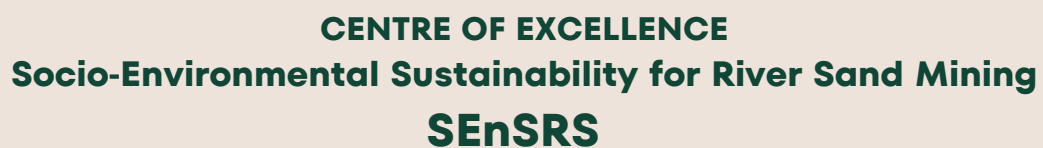
18 December 2025

A **Faculty Development Programme (FDP)** titled “**Drone Technologies and Intelligent Systems: Integrating AI, IoT & Aerial Platforms**” was successfully conducted on 18 December 2025 in online mode (Zoom). The programme aimed to enhance faculty understanding of emerging drone technologies and their integration with **Artificial Intelligence (AI)**, **Machine Learning (ML)**, and **Internet of Things (IoT)** frameworks.

The **afternoon session** was delivered by **Dr. Sartajvir Singh**, Chief Scientific Officer, CoE-SEnSRS, IIT Ropar, who served as the **Resource Person**. The session focused on **Drone AI-ML applications**, covering both **pre-processing and post-processing of aerial data**. Participants gained insights into intelligent data workflows, analytics, and real-world use cases of drones in research and applied domains.

The FDP provided a valuable platform for academic professionals to interact with domain experts, strengthen conceptual clarity, and stay updated with advancements in **intelligent aerial systems**. The session contributed significantly to capacity building and knowledge enhancement in the rapidly evolving field of drone-based technologies.





## Photo Gallery





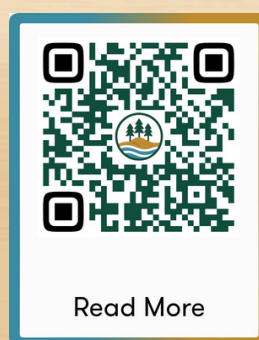


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