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PRESS-RELEASE

IIT (ISM) Launches GIAN Course on Inverse Methods and Machine Learning in Geosciences

The Indian Institute of Technology (Indian School of Mines) Dhanbad, today inaugurated a week-long Global Initiative of Academic Networks (GIAN) course titled “Inverse Methods and Machine Learning: Applications in Geosciences.” The course, sponsored by the Ministry of Education, runs from 23-27 June 2025 at the institute’s Executive Development Centre.

Director Prof Sukumar Mishra presided over the inaugural session as chief guest, joined by Deputy Director Prof Dheeraj Kumar. International expertise is being provided by Prof Mrinal K. Sen of the University of Texas at Austin, who is serving as foreign faculty. Also on the dais were Prof Sanjit Kumar Pal, Head of the Department of Applied Geophysics, and course coordinator Prof Saumen Maiti of the same department.

The first morning featured two foundational lectures. Prof Sen introduced participants to the fundamentals of inversion—covering forward and inverse problems, parameter-estimation challenges and case studies—while Prof Maiti explained matrix inversion techniques and the role of vector and Hilbert spaces in solving over-, under- and evenly-determined systems. In the afternoon, Prof Sen led a hands-on tutorial on matrix inversion for seismology, gravity and geo-electrical exploration.

Addressing the gathering, Prof Mishra distinguished between artificial intelligence and machine learning, noting that ML algorithms cannot fully replicate human intelligence. “The insights shared this week will help researchers harness these tools responsibly and effectively,” he said.

Prof Kumar highlighted the institute’s Mining Technology Innovation Hub, TEXMiN, and its growing use of AI and ML to improve mining operations. Prof Sen emphasised the expanding reach of machine-learning techniques across geoscience sub-disciplines. Earlier, Prof Maiti welcomed the delegates, and Prof Pal offered formal felicitations to the distinguished guests.

The course will provide researchers and industry professionals with a deep dive into how inverse methods and machine-learning frameworks are transforming the interpretation of spatial and temporal geoscience data—especially for imaging subsurface structures and characterising earth materials.

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