Report on Skill Development Programme titled "Recent Technologies in Building Construction" organized by
Department of Civil Engineering, Integral University
in association with
CSIR – Central Building Research Institute (CBRI), Roorkee

A two-day Skill Development Programme (SDP) titled "Recent Technologies in Building Construction and Intellectual Property Rights (IPR)" was successfully organized by the Department of Civil Engineering, Integral University, in association with CSIR–Central Building Research Institute (CBRI), Roorkee, on 21st–22nd January 2026 at the Seminar Hall, Block E, Integral University. The programme aimed to enhance the technical competence and research quality of faculty members, research scholars, and students by exposing them to emerging construction technologies, sustainable building practices, advanced numerical analysis tools relevant to civil engineering research and professional practice. A total of 9 faculty members and 106 Students from department of Civil Engineering, Integral University attended the programme.

Prof. Syed Aqeel Ahamd welcoming the guest speakers and participants

The programme commenced with a warm welcome address by Prof. Syed Aqeel Ahmad, Head, Department of Civil Engineering, Integral University, followed by the bouquet presentation to the guest speakers from CSIR-CBRI. In his address, he emphasized the importance of capacity-building initiatives in bridging the gap between academia, industry, and research organizations. He highlighted the need for adopting modern construction technologies, sustainable practices, and innovation-driven research to address contemporary challenges in civil engineering.

Dr. Neeraj Jain, Senior Principal Scientist, CSIR-CBRI, Roorkee, presented an overview of CSIR–Central Building Research Institute, outlining its mandate to advance building science and technology for national development. He discussed CBRI's multidisciplinary research contributions in building materials, structural engineering, energy-efficient buildings, disaster mitigation, and sustainable construction. He also highlighted the institute's role in technology development, consultancy, technology transfer, and capacity building for the construction sector.

Dr. Neeraj Jain providing the overview of CSIR-CBRI

Technical Sessions

Session 1: Energy Efficiency of Buildings

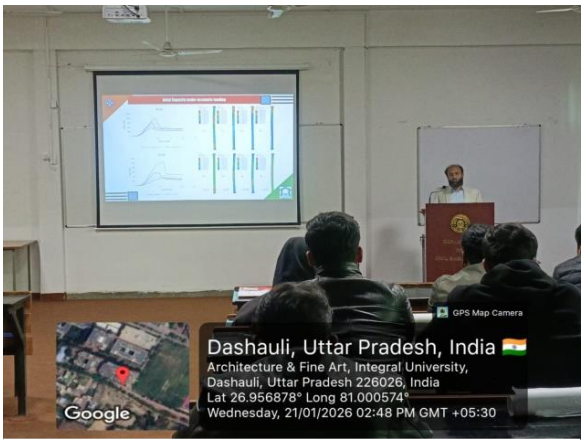
Speaker: Dr. Tabish Alam, Principal Scientist, CSIR-CBRI

Dr. Tabish Alam delivering his lecture

The session underscored the critical role of energy-efficient building design in achieving sustainable development. It comprehensively discussed passive design strategies, including building orientation, natural ventilation, daylighting, shading devices, insulation, and high-performance building envelopes. Active energy-efficient systems such as advanced lighting solutions, HVAC systems, smart controls, and building automation were also emphasized. The integration of renewable energy systems into building design was clearly explained, along with references to relevant energy codes and standards. Practical case examples illustrated real-world implementation approaches, while the economic advantages of energy efficiency particularly the reduction in operational energy costs were highlighted.

Session 2: Pre-Fabricated Structural Elements

Speaker: Dr. Md. Muslim Ansari, Senior Scientist, CSIR-CBRI



Dr. Md. Muslim Ansari during his lecture

The session highlighted the increasing need for industrialized construction to address the demands of modern infrastructure development. Various prefabricated structural systems, including precast concrete, steel, and hybrid systems, were discussed along with their applications. The lecture compared the structural design philosophy and behavioural differences between monolithic and prefabricated construction, emphasizing connection systems and joints as critical performance-governing components. The seismic behaviour and suitability of prefabricated structures in earthquake-prone regions were also examined. Key aspects related to manufacturing precision, quality control, and on-site erection challenges were addressed. The session concluded by identifying existing research gaps and outlining future research opportunities in the field of prefabricated construction.

Session 3: Numerical Modelling of Structural Elements and Analysis Using FE Software

Speaker: Dr. Md. Muslim Ansari, Senior Scientist, CSIR-CBRI

The lecture focused on research-oriented numerical modelling using finite element (FE) software. Fundamental aspects of FE analysis, including discretization, element selection, and meshing strategies, were explained with emphasis on realistic material modelling and appropriate boundary conditions. Both linear and nonlinear analysis approaches were discussed, along with issues related to convergence, mesh sensitivity, and numerical accuracy. The importance of validating numerical models through experimental and analytical comparisons was highlighted. Practical applications of FE modelling in design optimization and failure analysis were also demonstrated.

Day 2 Sessions

Session 4: Sub-Surface Profiling Techniques

Speaker: Er. Ajay Dwivedi, Senior Technical Officer, CSIR-CBRI

Er. Ajay Dwivedi delivering his lecture

The session focused on advanced non-destructive sub-surface investigation techniques, particularly Ground Penetrating Radar (GPR). Principles, methodology, and data acquisition procedures of GPR surveys were explained. Interpretation of GPR profiles and data outputs was demonstrated. Prestigious case studies from heritage structures such as the Taj Mahal, Qutub Minar, and Sun Temple Konark were presented. Applications in foundation investigation and borehole radar profiling were discussed. Limitations and accuracy considerations of GPR were highlighted. The session emphasized the importance of sub-surface investigations for structural safety and conservation.

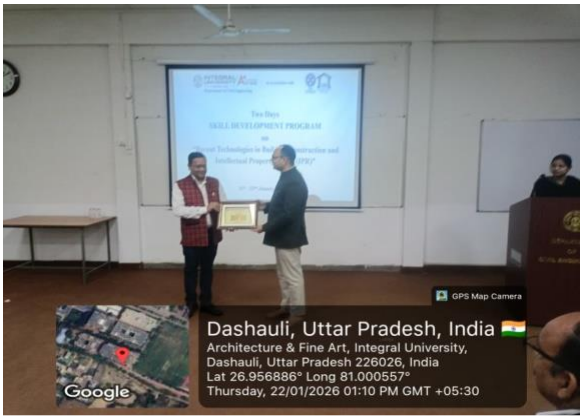
Session 5: Gypsum Circularity – Development of Low-Carbon Gypsum Plaster

Speaker: Dr. Neeraj Jain, Senior Principal Scientist, CSIR-CBRI

The lecture focused on waste management and circular economy principles in construction materials. It discussed various waste categories and the current waste utilization scenario in India. The concept of gypsum circularity, including reuse and recycling of gypsum waste, was explained in detail. CSIR-CBRI's contributions toward phosphogypsum utilization and the development of energy-efficient gypsum calcinatory systems were

Dr. Neeraj Jain delivering the lecture on circular economy

highlighted. The session also presented innovative gypsum-based products such as alpha plaster, boards, blocks, tiles, wall panels, and water-resistant binders, along with the utilization of fluor gypsum and FGD gypsum. Overall, the lecture demonstrated the sustainability benefits of low-carbon construction material development.



Prof. Syed Aqeel Ahmad presenting the memento to the guests

Prof. Syed Aqeel Ahmad concluded the programme by summarizing the key learnings from the two-day SDP and encouraged the organization of more such research-oriented and industry-linked initiatives for students and faculty members. He expressed sincere gratitude to the experts from CSIR-CBRI for sharing their valuable knowledge and experience. As a token of thanks he also presented the mementos to the guest speakers.

The programme concluded with a formal vote of thanks proposed by Dr. Zishhan Raza Khan, Associate Professor, Department of Civil Engineering. He acknowledged the contributions of all guest speakers from CSIR-CBRI and extended thanks to Prof. Syed Aqeel Ahmad for his guidance, Dr. Vikash Singh for coordination support, Dr. Neha Mumtaz for effective session compering, and all faculty members and students for their active participation.

Dr. Zishan Raza Khan delivering vote of thanks

The Skill Development Programme aligns with **SDG 4** (Quality Education) by enhancing technical skills and research competence; **SDG 7** (Affordable and Clean Energy) and SDG 13 (Climate Action) through emphasis on energy-efficient buildings and low-carbon materials; **SDG 9** (Industry, Innovation and Infrastructure) by promoting advanced construction technologies and numerical modelling; **SDG 11** (Sustainable Cities and Communities) through sustainable and resilient building practices; **SDG 12** (Responsible Consumption and Production) by highlighting circular economy and waste utilization in construction materials; and **SDG 17** (Partnerships for the Goals) by strengthening academia–research collaboration with CSIR-CBRI.


CENTRAL AUDITORIUM
INTEGRAL UNIVERSITY
www.iul.ac.in