

DEPARTMENT OF CIVIL AND INFRASTRUCTURE ENGINEERING

# CHARACTERISATION AND NUMERICAL MODELLING OF CEMENTITIOUS MATERIALS

NOVEMBER 10<sup>th</sup> - NOVEMBER 14<sup>th</sup>, 2025

International Faculty and Host Faculty



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**PRE-REGISTER HERE**

**Registration Form:** <https://forms.gle/mwwLFgNs3brv5ME7A>

**Only 50 seats are available**

**Registration from 25<sup>th</sup> August to 01<sup>st</sup> October, 2025**

**Accommodation Form:** <https://forms.gle/JJwUzmdbDxJ5eiUUA>

**Intimation to shortlisted candidates: 17<sup>th</sup> October, 2025**

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**Venue:**  **IIT DHARWAD, KARNATAKA,  
BHARATA (INDIA)**

## HYBRID MODE

### REGISTRATION FEES (Inclusive of GST)

STUDENTS	INR 1180
FACULTY	INR 5,900
OTHERS	INR 11,800
FOREIGNERS	USD 475

**Click Link for Fees Payment!**

<https://www.onlinesbi.sbi/sbicollect/icollecthome.htm?corpID=3407756>





## Overview of Course

This hybrid-mode program offers a comprehensive and advanced exploration of characterization and numerical modeling in cementitious materials, designed to equip participants with both theoretical knowledge and practical skills. It begins with an in-depth study of cement hydration chemistry, focusing on the molecular mechanisms that govern the transformation of raw materials into a hardened concrete matrix—processes that are critical to determining the strength and long-term durability of concrete. Participants will gain hands-on experience in modeling cement hydration using computational tools to predict and analyze hydration kinetics. The program also includes a detailed module on the chemistry of supplementary cementitious materials (SCMs), emphasizing their role in improving concrete performance and promoting sustainability. This is followed by calculation examples for hydration of blended cements, enabling participants to assess the implications of various blending approaches. A dedicated module on numerical modeling for chloride ingress further strengthens the participant's ability to develop and implement predictive tools. The program also covers advanced materials characterization techniques for cementitious systems, with a focus on special concretes used in applications such as 3D concrete printing and affordable housing. Special sessions will be conducted on 3D concrete printing technology, including demonstrations using a well-equipped, state-of-the-art facility to showcase innovations in digital construction. Participants will also engage in experimental techniques for measuring thermal properties, supported by hands-on laboratory sessions to understand heat transfer behavior in cement-based materials. Furthermore, the module on special concretes for sustainable infrastructure introduces participants to innovative formulations designed for modern infrastructure needs, with an emphasis on low-carbon, durable alternatives. Overall, the program thoughtfully integrates scientific principles, numerical modeling, and experimental validation, empowering participants to address complex challenges in concrete chemistry, durability, and the development of sustainable and digitally enabled construction solutions.

### Tentative Lecture Schedule

Day 1	<ul style="list-style-type: none"><li>• Cement hydration Chemistry</li></ul> <b>Lab #1</b> - Modeling for cement hydration chemistry.
Day 2	<b>Quiz 1</b> <ul style="list-style-type: none"><li>• Chemistry of Supplementary Cementitious Materials</li><li>• Materials Characterization Techniques.</li></ul>
Day 3	<b>Quiz 2</b> <ul style="list-style-type: none"><li>• Special Concretes for 3D Concrete Printing and Sustainable Housing</li></ul> <b>Lab #2</b> - Modeling for Hydration of Blended Cements
Day 4	<b>Quiz 3</b> <ul style="list-style-type: none"><li>• Concrete Durability &amp; Chloride Ingress and extended for carbonation and acid attack case studies</li></ul> <b>Lab #3</b> - Demonstration on Characterization of Cementitious Materials
Day 5	<b>Quiz 4</b> <ul style="list-style-type: none"><li>• Implementing a Numerical Model for Chloride Ingress in Concrete.</li><li>• Extended for carbonation and acid attack case studies.</li></ul> <b>Lab #4</b> - Demonstration on 3D Concrete Printing Technology

Note: Other Experts from Industry/Academia also be invited to deliver a talk or demonstration during GIAN program.