



6 DAY FACULTY DEVELOPMENT PROGRAM ON ALLOY DESIGN AND PROCESSING: EXPERIMENTAL, SIMULATION AND MACHINE LEARNING APPROACHES

21-26 November 2025

Organized By

FMME Department

Indian Institute of Technology (Indian
School of Mines) Dhanbad



ICME Lab
FMME/IIT(ISM) Dhanbad

Surface and Coatings lab
FMME/IIT(ISM) Dhanbad

Under the aegis of



University Grants Commission



सत्यमेव जयते
Ministry of Education
Government of India

**MALAVIYA MISSION
TEACHER
TRAINING PROGRAMME**

ABOUT THE INSTITUTE

Indian Institute of Technology (ISM) Dhanbad, earlier known as Indian School of Mines Dhanbad. The Indian School of Mines was formally opened on 9th December 1926, by Lord Irwin, the then Viceroy of India to address the need for trained manpower related to mining activities in the country with disciplines of Mining and Applied Geology. In 1967 it was granted the status of a deemed to be university under Section 3 of UGC Act, 1956. In 2016, ISM Dhanbad has got the status of IIT. Since its establishment, IIT(ISM) Dhanbad has undergone considerable expansion of its activities, and presently it can be considered as a total technology education institute. At present, the Institute has 17 departments and several centres, which are equipped with all necessary infrastructure and worldclass faculties to undertake all kinds of fundamental and applied research problems.

Online Mode

No Registration Fee

AREAS COVERED:

Alloy Design, Material Processing, Experimental Approach, ICME approach, Machine Learning Approach, Materials Informatics

OVERVIEW:

Design and processing of materials are necessary for all fields of engineering applications. Generally, 10 to 15 years will take for the materials from their design stage to application. Understanding the accelerated design of materials is necessary for the Materials and manufacturing industries. Currently, several computational tools, high throughput experiments, and Machine Learning based approaches are available for the accelerated design of materials. This FDP aims to provide participants with a comprehensive understanding of alloy design and processing, experimental approaches, material modelling and Machine-learning approaches used for new material design and processing.

COURSE CONTENT:

1. Fundamentals of new material design and development
2. Introduction to computational tools for alloy design
3. Introduction to machine learning approaches and materials informatics for alloy design
4. Alloy design using the CALPHAD approach
5. Experimental studies for the new material design
6. Fundamentals of diffusion and heat treatment processes
7. Materials design for high temperature and structural applications
8. ICME approach for new material design and development
9. Alloy design for surface engineering applications
10. Industry case studies and technology translation pathways

SPEAKERS:

Industry experts and academicians will provide insights into the latest trends in alloy design and processing, emphasizing experimental and simulation approaches and emerging technologies. Eminent list of experts accepted to be featured in this FDP:

1. Prof. Sumanta Samal, IIT Indore
2. Prof. K G Pradeep, IIT Madras
3. Prof. Niraj Chawake, IIT Kanpur
4. Prof. Nithin B, IIT Bhilai
5. Prof. Prafull Pandey, IIT Gandhinagar
6. Prof. Gautam Anand, IIT(BHU)
7. Dr. Ramakrishnan R, DYSL-DRDO
8. Prof. K. Guruvidyathri, University of Hyderabad
9. Prof. Mohan Muralikrishna Garlapati, IIT Patna

WHO CAN ATTEND:

This FDP is designed for faculty members, and educators from the following disciplines (not limited to):

- Metallurgical & Materials Engineering and allied areas
- Mechanical Engineering and allied areas
- Chemical Engineering and allied areas
- Nanotechnology and allied areas
- Physics & Applied Sciences

PROGRAM COORDINATORS:

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ABOUT THE MISSION:

The National Education Policy (NEP) 2020 highlights the importance of motivated and capable faculty in higher education, emphasizing continuous professional development. To strengthen teacher training, the Malaviya Mission Teacher Training Programme (MMTTP) has been re-launched by restructuring existing initiatives like UGC-HRDCs and PMMMNMTT. The mission aims to enhance faculty capacity and integrate Indian values into teaching, research, and institutional development.

ABOUT FMME DEPARTMENT

The Department of Fuel Minerals and Metallurgical Engineering is one of the oldest departments in the institute, established in 1976, to address the processing issues of metallic, non-metallic and fuel minerals. Keeping up with the recent research trends, industrial requirements and facilitating high-end interdisciplinary research, Metallurgical Engineering was introduced to the department in the year of 2019. The department currently offers a BTech program in Mineral and Metallurgical Engineering, two-year MTech and PhD programs in Metallurgical, Fuel and Energy and Mineral Engineering. The department currently has 20 faculty members and two visiting professors. Sixteen fully functional laboratories with state-of-the-art research facilities are an integral part of the department.

ABOUT ICME LAB AND SURFACE & COATINGS LAB @IIT(ISM)

Surface and Coatings Lab focuses on Surface Engineering of varied material systems for diverse applications. The lab works on two key verticals:

SURFACE AND COATINGS LAB

Surface Engineering in Coatings and Additive Manufacturing (Thermal Spray Based Technologies)

- Functional coatings
- AI-applications
- Coatings for wear & tear
- Repair and remanufacturing
- Additive manufacturing
- Coatings for bio-medical implants



Surface Modifications of Polymeric Surfaces for Functional Applications

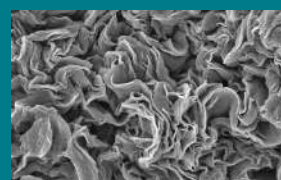
- FGMs for structural applications
- Engineered polymer surfaces for environmental applications
- Engineered polymer surfaces for battery applications
- Polymer coatings for environmental applications



Metal 3D Printing

Cracked GI pipe

Repaired GI pipe



Repair and remanufacturing Surface modifications of polymer surfaces

Integrated Computational Materials Engineering Lab works on new material design and development using computational and experimental facilities for various advanced applications with these verticals:



Materials and microstructure informatics



Welding and additive manufacturing simulations



Thermo-mechanical processing of materials



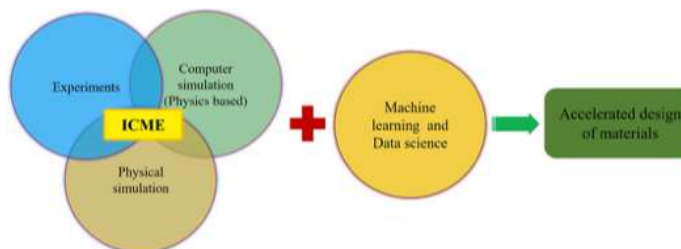
Physical simulation of manufacturing process



Physical simulation of manufacturing process



Microstructure simulation



LinkedIn

<https://www.linkedin.com/in/icme-lab-at-iit-ism-dhanbad-5a9b86363/>

HOW TO REGISTER

1. The participants should first register at <https://mmc.ugc.ac.in/> using their email ID.
2. Use the Login credentials received over the registered Email Id to LOGIN as PARTICIPANT.
3. From the Dashboard click on “Apply for Other Programmes”
4. Click on Apply for and Select “Short Term Programme/ Faculty Development Programme ”
5. Click on Centre & Programme Date and Select “Indian School of Mines (Jharkhand) (21/11/25 - 26/11/25)”
6. Click on Title and select the Programme title that automatically comes from the dropdown option.
7. Next, Fill in the other required details like Your Subject Area Specialization; Year of Joining; Teaching Experience and others
8. Upload the NOC duly signed and approved by the Head of your Institution by clicking on the “Choose File” Button. (Sample NOC format is available at https://mmc.ugc.ac.in/Uploads/MMTTP_Nomination%20Letter_Format.pdf)
9. Finally, click on the Submit button.
10. Last date to register is 18.11.2025, but please register well in advance to avoid last-minute rush.
11. The participants will get a confirmation Email after registration.

**LAST DATE OF REGISTRATION:
18.11.2025**