



PRE-CONFERENCE WORKSHOPS

Objective:

Structure and Characterization of Materials is a vital part of any material course and microscopy is one of the most essential characterization tools for the processing, development, and designing of the conventional as well as advanced materials. Nevertheless, the different microscopy technique available in the materials field requires proper expertise and skill in conducting the experiment, precise analysis and interpretation of the acquired data/results. Some of these techniques are highly sophisticated, making their usage impossible without any rigorous training and experience. The lack of exposure and expertise in these techniques is becoming more and more a limitation in carrying out the highest possible quality of research using these advanced research tools. Hence, this workshop aims to address this shortcoming and is intended to educate Metallurgical and Materials researchers from industries and academia on the fundamentals and recent developments in the field of microscopy techniques.

Scope of the workshop:

This one-day pre-conference workshop will include lectures on fundamentals and hands-on-training or demonstrative experiments at high-end equipment laboratories of NIT Rourkela and will be conducted by the experts from different institutes and there will be three parallel sessions as mentioned below:

PWS - I: Scanning electron microscopy

Theory: Instrument and its attachment, Fundamentals for Electron microscopy, Different Imaging modes: SE, BSE, Image analysis in SEM including failure analysis, EVSEM, FE-SEM, EDS and WDS, EPMA, EBSD fundamentals, FIB-SEM, In-situ SEM, High temperature SEM, and Sample preparation for SEM and other SEM based techniques.

Demo: Sample preparation for non-conducting samples, SE and BSE imaging modes, EDS analysis, Hands on experience on image acquisition and processing

PWS - II: Transmission electron microscopy

Theory: Instrument and its attachment, Fundamentals for Electron microscopy including Reciprocal lattice and Ewald sphere, Contrast mechanism/Interpretations, Imaging modes: BF, DF and WB-DF, Defect analysis in TEM, Electron diffraction: SAED, CBED, etc., Fine structure in SADP and interpretations, Specimen preparation for TEM, Scanning Transmission Electron Microscopy, High Resolution Transmission Electron Microscopy.

Demo: Sample preparation, bright and dark field imaging, SAED patterns, HRTEM, image processing

PWS - III: Scanning Probe Microscopy

Theory: Fundamentals of scanning probe techniques, Instrument and its attachment, Atomic force microscopy, Contact and non-contact mode of operations and their applications, working of piezo sensors, force-displacement analysis for nanomechanical property evaluations, scanning tunneling microscopy and its applications, magnetic force microscopy, electrostatic force microscopy.



Demo: Sample preparation, contact and non-contact AFM imaging, F-D analysis, STM imaging, MFM mode of operation

DETAILS OF WORKSHOP				
Code and Date	Duration and Topics	Title of the Workshop	Venue	Conveners
WS-01 (5th Dec)	One Day (Material Science)	Transmission Electron Microscopy	CH Dept., NIT Rourkela	Prof. Gouthama (MME Dept., IIT Kanpur) Prof. S.K. Sahoo (MM Dept., NIT Rourkela)
WS-02 (5th Dec)	One Day (Material Science)	Scanning Electron Microscopy	MM Dept., NIT Rourkela	Prof. D. Chaira (MM Dept., NIT Rourkela)
WS-03 (5th Dec)	One Day (Material Science)	Scanning Probe Microscopy	MM Dept., NIT Rourkela	Prof. A. Mallick (MM Dept., NIT Rourkela)

Eligibility:

Research Scholars, Postdoctoral Fellows, Young Faculty/Doctors/Engineers, and Scientific/Technical Staff associated with Microscopy methods. **Priority would be given to the Delegates registered for ICPCM Main Conference and Life Members for EMSI.**

Selection:

Convener(s) of the respective workshop would be deciding on the merit of the applications. Please contact the conveners of the workshop in case of any query regarding the workshop.

Accommodation:

Accommodation will be provided at NIT Guest House, Student hostels and wherever else available, on first-cum-first basis. Accommodation charges shall be borne by participants.

Registration:

Interested Delegates/participants have to register through ICPCM website and have to give their preference among workshops along with accommodation preferences, details.

Selected candidates will be informed through mail, only shortlisted candidates have to pay registration fee.

Sl. No.	Registration Category	Registration Fee
1.	Conference Participant	INR 500
2.	EMSI Members	INR 500
3.	Research Scholars	INR 500
4.	Faculties/Scientists/Technical Staff	INR 1000
5.	Industry Experts	INR 1500

***Certificates will be given to the participants**

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