

Registration form

Name: _____

Designation: _____

Organization: _____

Address for correspondence: _____

E-mail: _____

Phone: _____

Particulars of Registration Fee:

DD No.: _____ Date: _____

Amount: _____ Bank: _____

Accommodation Required: Yes/No

Date: _____ Signature: _____

Place: _____

The complete registration form accompanied by DD of requisite amount may be mailed well in advance to the coordinator. Payment in form of DD should be made in favor of "Director, NIT Rourkela", payable at Rourkela.

Course venue

Established in 1964, the Department of Metallurgical and Materials Engineering has been emerged as powerhouse for academics, scientific research and cutting edge technologies. With time, the department grew noticeably and established new areas of research and teaching in materials engineering, while retaining its strength in traditional areas in Metallurgy. The well-developed infrastructure and diversified expertise of the faculties have provided the department a global acceptance. The department is actively involved in research activities in the front line areas of metallurgical and materials engineering in collaboration with reputed R&D organizations and industries throughout the country.

Course deliverables

The five days short-term course will be divided approximately equally between classroom lectures and hands-on training. Demonstrations in the fields of mechanical behavior fundamentals and mechanical characterization methods including creep, fatigue, fracture, non-destructive testing and computational techniques including molecular dynamics simulation, finite element analyses will be given. Lecturers will be drawn from the faculty members of NIT Rourkela, IIT and government R&D laboratories. A set of course notes will be provided to participants.

Course coordinators

Coordinator

Dr. Krishna Dutta

Assistant Professor

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NIT Rourkela

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Co-Coordinator

Dr. Natraj Yedla

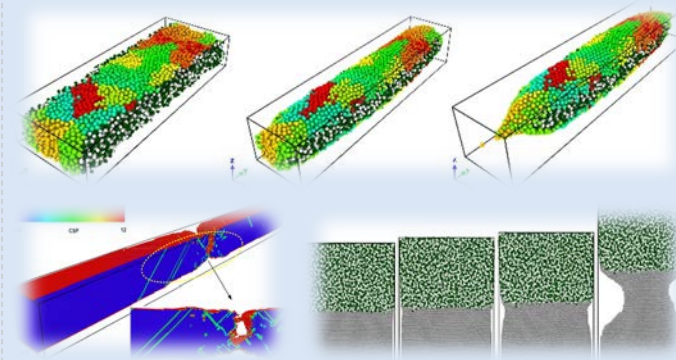
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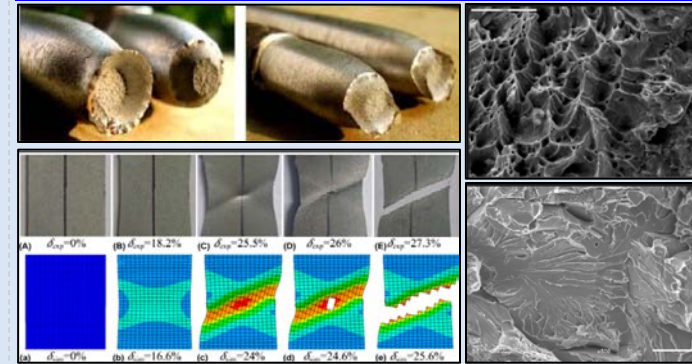
E-mail: mechanicalbehavior.nitrkl@gmail.com



TEQIP – III SPONSORED SHORT TERM COURSE
ON

**DEFORMATION BEHAVIOUR AND
FRACTURE OF ENGINEERING
MATERIALS: EXPERIMENTAL AND
SIMULATIONS**

December 10 - 14, 2018



Organized by
Department of Metallurgical and Materials Engineering



National Institute of Technology Rourkela
Rourkela-769008, Odisha, India





Introduction to the course

Mechanical Behavior-

Engineering materials to be selected for diverse structural applications are to be assessed in terms of strength, ductility and toughness. To measure these there are several modes of deformation such as tensile, compression, indentation, bending shear, fatigue and creep. So the present course is aimed at introduction, methodology of conducting these tests on several metal and alloys and interpretation of the results.

Deformation mechanism –

Generally, crystalline materials show ductile or brittle behavior when subjected to load. The factors that influence are temperature and strain rate of deformation. However, there is a major role played by the defects to exhibit such behavior. So, an insight into the various types of defects, their role on the deformation behavior is necessary. The observed deformation mechanisms at room temperature in crystalline materials are slip or twinning and at high temperature it is by creep. So the present course is aimed at cover the above aspects.

Modeling and simulation -

Classical Molecular dynamics (MD) simulations will be carried out on LAMMPS platform. The MD deformation codes will be run and then analysis of the deformation results will be carried out using OVITO software.

Computational simulations such as finite element method (FEM) is an important tool for analysis at the continuum level which helps in design and development of engineering structures. The basics of FEM and analyses will be discussed in the course.

Course outline

| | |
|-------------------|--|
| Module I | Mechanical properties fundamentals: Basics of elasticity and plasticity, dislocation theory, hardness testing, tensile and compression testing, fracture mechanics, impact, fatigue and creep behaviour. |
| Module II | Non-destructive testing: Various kinds of non-destructive evaluations of defects, test procedures. |
| Module III | Finite element methods/analysis: Applications of finite element methods in mechanical behavior of metals and alloys. |
| Module IV | Simulation fundamentals: Molecular dynamics simulation for mechanical property evaluation, solidification modeling |
| Module V | Tests and simulations: Specific mechanical tests and phenomena with an emphasis on the specific properties probed as well as the testing techniques and their capabilities/ limitations <ul style="list-style-type: none"> • Tensile testing • Indentation & hardness • Impression Creep • Fracture, Fractography • Fatigue |
| Module VI | Case studies: Mechanical properties of different materials systems. The emphasis will be on highlighting the testing or simulation technique used to probe the desired property and to highlight the unique demands that different materials systems impose in terms of testing <ul style="list-style-type: none"> • Light Alloys • Steels • Ceramics • Composites |

Who should attend?

- Young faculties, senior research scholars
- Quality control personnel, Inspection and maintenance engineers, Technical managers, Design engineers,.
- Engineers those involved in failure analysis.

The successful participants who will attend the whole course will be given participation certificate.

Important Dates

Last date for the receipt of application is 25th of November 2018 and the notification of acceptance will be by 30th of November.

Registration Fees

Faculties from institutes : INR 3000

Industry delegates : INR 5000

Research Scholars : INR 2000

The course fee includes course material, breakfast, lunch, and refreshment during the program days. Participants (Faculty members and Ph.D. students) from NIT Rourkela are exempted from paying registration fees.

Accommodation

Accommodation will be provided in institute guest house on first come first serve basis. Double occupancy rooms for scholars and young faculties.

South block guest house : INR 1200 per day

North block guest house : INR 600 per day

Resource Persons

Dr. Krishna Dutta, NIT Rourkela

Dr. Natraj Yedla, NIT Rourkela

