

AICTE Sponsored
Online Short-Term Course

on

**RECENT ADVANCES IN
MODELLING OF INELASTIC
RESPONSE AND INTEGRITY
ASSESSMENT OF METALS**

10th January-13th January, 2022
and
17th January- 20th January, 2022

Coordinator

Prof. C Lakshmana Rao



Organized by

Department of Applied Mechanics
Indian Institute of
Technology Madras Chennai -
600036
www.iitm.ac.in

INTRODUCTION

Integrity assessment of metals and structures is made of metallic materials is an important aspect of design of structural systems. Life estimation models are used to predict the life of several structures such as nuclear structures, automobiles, underwater and space vehicles, as well as consumer components in several applications. Predictive models based on an understanding of fundamental material response of metals have a stronger basis, in comparison to statistical projections purely based on available past history or mathematical fits based on pure experimental observations. These material models are useful when they are used to predict the response of structures using computational tools.

COURSE OBJECTIVES

1. To introduce the classical material models for integrity assessment of metals, which attempt to capture the inelastic response such as creep, fatigue and high-rate response.
2. Critically assess the strengths and limitations of some of the popular material models used in the literature.
3. To introduce the advantages of a new framework of combining Newtonian mechanics with thermodynamics, and to illustrate the use of this framework in modelling of inelastic response of metals.

SCOPE

- Exposure to typical experimental observations on inelastic mechanical response of metals in the form of plasticity, creep, fatigue and high strain response.
- Review of popular definitions of damage and their use in material modelling.
- Discussion of popular phenomenological Damage Mechanics Models.

- Introduction to the alternate framework of damage using concepts of Unified Mechanics.
- Introduction to Computational Damage Mechanics

COURSE DURATION & VENUE

The course is of **six working days** duration from **10th January - 20th January, 2022**. Classes will be held online using Google Meet. The link will be shared upon acceptance.

ABOUT THE DEPARTMENT

The Department of Applied Mechanics has been in existence since 1959 and has grown into a full-fledged inter disciplinary graduate research department over the years. The Department focuses on academic activities in three broad areas viz., Biomedical Engineering, Fluid Mechanics and Solid Mechanics. The Department has played a major role in contributing to the academic community and society.

The faculty have won international recognition for their industrial research and sponsored projects. Some of the facilities available in various laboratories of this Department are unique in the country. Coupled with its multi-disciplinary background, the Department boasts of a highly diverse and experienced faculty. It has an excellent student-teacher ratio, providing opportunities for academically intense learning. Equipped with state-of-the-art facilities in a serene campus, the department offers an enriching academic environment.

Website: <https://apm.iitm.ac.in/>

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Online Short-Term Course On

Recent advances in modelling of inelastic response and integrity assessment of metals

**10th January- 13th January, 2022
and
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APPLICATION FORM

Name:
Designation:
Department:
Organization:
Qualification:
Experience:
Mailing Address:
Phone:
Mobile:
Fax:
E-mail:
Date:

Signature of the Applicant

SPONSORSHIP CERTIFICATE

Certified that Dr. /Mr. /Mrs.
is a faculty of our institute and is hereby nominated for attending the QIP short term course on “Recent advances in modelling of inelastic response and integrity assessment of metals” to be conducted at IIT Madras from 10th January- 13th January 2022, and 17th January- 20th January 2022.

Signature of Sponsoring Authority
(With date and seal)

HOW TO APPLY:

Please register to the short term course using the following QR Code or google form link:

<https://bit.ly/clrworkshop>



Send the original copy by post to:

Prof. C Lakshmana Rao
Department of Applied Mechanics Indian Institute of Technology Madras Chennai – 600 036
Tel.: +91 - 44 – 22575078
E-mail: lakshman@iitm.ac.in
<http://apm.iitm.ac.in/smlab/clr/>

REGISTRATION FEE

There is **no course fee** for the participants from AICTE approved engineering colleges.

RESOURCE FACULTY

The resource faculty includes experts from State University of New York at Buffalo, IIT Madras and industries.

ELIGIBILITY

The course is open to faculty with background in Applied Mechanics, Mechanical, Aerospace, Automobile, Civil, Metallurgy and Material Science, and Ocean Engineering.

IMPORTANT DATES

- **Last date for sending the applications: 3rd January 2022**
- **Intimation of selection: 5th January 2022**

COURSE SCHEDULE

The schedule of the course will be regularly updated at

<https://sites.google.com/view/iitmstccourse/schedule>