

Mechanics of Fracture

Overview

Failure in materials and structures through fracture is extremely important in many structural, material and geophysical applications, at length scales that span from the atomic to the tectonic. This course will cover topics in that begin with an overview of linear elastic fracture mechanics (LEFM) and build to advanced topics in fracture modeling, analysis and characterization. The mechanisms of fracture in different classes of materials will be discussed. Standards and application of fracture critical design methodology will also be discussed.

Advanced topics that will be covered include elastic plastic fracture mechanics, *ad hoc* damage and failure models, cohesive zone models, phase-field model, and numerical methods. Selected topics in dynamic fracture will also be covered. The course will consist of 14 lectures, homework assignments and demonstration of experiments.

Participants will greatly benefit from the course if they have prior exposure to LEFM. Prospective participants are advised to go through the video lectures on Engineering Fracture Mechanics available at the NPTEL site <http://nptel.ac.in/courses/112106065/>

Dates for the Course	19th December, 2016 to 23rd December, 2016
Host Institute	IIT Madras
No. of Credits	1
Maximum No. of Participants	60
You Should Attend If...	<ul style="list-style-type: none"> ▪ You are a mechanical or aerospace engineering research scientist or physicist interested in modeling or characterizing fracture, pattern formation and designing materials and/or structures. ▪ You are a professional engineer interested in designing fracture critical structures. ▪ you are a student or faculty from academic institution interested research on the mechanics and physics of fracture.
Course Registration Fees	<p>The participation fees for taking the course is as follows: Student Participants: Rs.1000 Faculty Participants: Rs.3000 Government Research Organization Participants: Rs.5000 Industry Participants: Rs.10000</p> <p>The above fee is towards participation in the course, the course material, computer use for tutorials and assignments, and laboratory equipment usage charges.</p> <p>Mode of payment: Demand draft in favour of “Registrar, IIT Madras” payable at Chennai The demand draft is to be sent to the Course Coordinator at the address given below. Prof. K. Ramesh, Department of Applied Mechanics, IIT Madras, Chennai - 600036</p>
Accommodation	<p>The participants may be provided with hostel accommodation, depending on the availability, on payment basis. Request for hostel accommodation may be submitted through the link: http://hosteldine.iitm.ac.in/iitmhostel</p>

Course Faculty



Prof. Krishnaswamy RAVI-CHANDAR holds the Temple Foundation Professorship #1 at the University of Texas at Austin. His research interests are in the area of mechanisms and mechanics of deformation and failure. He is the author of a book titled *Dynamic Fracture*, Elsevier, 2004. He has received Drucker

medal, 2015, ASME and Murray medal, 2004, SEM. He is the Fellow of ASME, SEM, AAM and an Honorary fellow of International Congress of Fracture. He is the Editor-in-chief of International Journal of Fracture since 2000 and is in the Editorial boards of several reputed journals.



K. Ramesh is currently a Senior Professor at the Department of Applied Mechanics, IIT Madras and formerly a Professor at the Department of Mechanical Engineering, IIT Kanpur. He has made significant contributions to the advancement of Digital Photoelasticity. He has pioneered a new paradigm in Engineering Education by writing innovative e-Books on *Engineering*

Fracture Mechanics and *Experimental Stress Analysis* published by IIT Madras. He has received the Zandman award, 2012, SEM and is a Fellow of the Indian National Academy of Engineering and a member of the editorial boards of several reputed journals.

Course Coordinator

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URL:

<http://apm.iitm.ac.in/smlab/kramesh/index.html>