

# IIT Hyderabad Invites applications for Short Term Course on ‘Nonlocal Mechanics Approaches for Modelling Localized Deformations’

Hyderabad: Indian Institute of Technology Hyderabad is inviting applications for a Short Term Course on ‘Nonlocal Mechanics Approaches for Modeling Localized Deformations’ to be held from 19th to 21st February 2019 here. The last date to apply email is 15th December, 2019. Further information can be obtained from <http://nmamld2020.com/home.html>

This course will provide an overview of modelling approaches used in the mechanics of elastic and inelastic materials and structures, with special attention to the objective description of highly localized deformation modes such as damage, fracture, and shear bands.

Highlighting the importance of this short-term course, Dr. Amirtham Rajagopal, Associate Professor, Department of Civil Engineering, IIT Hyderabad, said, “This course is intended to provide graduate students, engineers, and researchers working in aerospace, automotive, civil, mechanical engineering, and materials and manufacturing industries with the theory and applications of nonlocal and nonlinear mechanics approaches for modelling localized elastic and inelastic deformations. More specifically for modeling fracture or damage in materials. The course will be co taught by IIT H faculty, together with renowned international faculty such as Prof JN Reddy and Prof Arun Sriivasa from Texas A&M university USA.”

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The persons attending the course will benefit in gaining knowledge and information in the following areas:

- Ø nonlocal mechanics theories,
- Ø nonlinear analysis,
- Ø elastic-plastic models, and
- Ø damage and fracture in solids.

Prominent speakers in this short-term course include

- (a) Prof. J N Reddy, Oscar S. Wyatt Jr. Chair, Texas A&M University, USA.
- (b) Prof. Arun Srinivasa, Texas A&M University, US, and
- (c) Dr. Amirtham Rajagopal, Associate Professor, Department of Civil Engineering, IIT Hyderabad,

The Schedule of this course is as follows:

**DAY ONE: 19 Feb 2020, Introduction to Nonlinear Finite Elements**

**Session 1**

- Introduction to nonlinear finite element analysis (FEM) through 1D and 2D model equations
- Solution strategies in nonlinear algebraic equations (Picards and Newtons methods)
- Newton-Raphson method under load control, direct displacement control, and arc length control
- Nonlinear analysis of structural problems (beams, plates, and shells)

**Session 2**

- Introduction to material non-linearity elastic-plastic
- Computational plasticity: Basics
- Plasticity based models and return mapping algorithm in 1D, 2D, and 3D.
- Rate dependent plasticity models

**DAY TWO: 20 Feb 2020, Introduction to Nonlocal Mechanics**

**Session 1**

- Introduction to generalized continuum models
- Introduction to nonlocal theories
- Strain localization and size effect
- Strong discontinuity models
- Regularized continuum models

**Session 2**

- Nonlocal models for rods, beams, plates, and laminates
- Introduction to PD theory

**DAY THREE: 21 Feb 2020, Nonlocal damage mechanics and phase field approaches**

- Damage Mechanics (isotropic, anisotropic damage models, coupling of damage and plasticity)
- Nonlocal damage models and nonlocal integral plasticity
- Variational formulation of gradient damage models
- Gradient enriched plasticity models
- Phase field approaches to damage

*Source: India Education Diary*

*Date: 09/12/2019*