

Internal Length Gradient Mechanics Across Scales, Materials/Processes and Disciplines: The Paradigm of Gradient Elasticity

Overview

The aim of the course is to introduce a simple and convenient method (higher-order gradient and corresponding internal lengths) for describing material behavior in small (micro/nano) volumes, for which conventional continuum theories fail to capture the emergence of instabilities, pattern formation, and size effects. This will be done by first focusing attention to one-dimension where the mathematics remain simple and the physical assumptions can be easily introduced and illustrated. Specific examples from current technology and interdisciplinary science will be presented. These will include benchmark problems in nanotechnology, renewable energy, and biomedicine.

Dates for the Course	15th November, 2017 to 22nd November, 2017
Host Institute	IIT Madras
No. of Credits	1
Maximum No. of Participants	30
You Should Attend If...	<ul style="list-style-type: none"> ▪ You are a senior under graduate student, postgraduate students or a faculty in engineering and applied mathematics. ▪ Engineers and researchers from industry, government organization and R&D laboratories. ▪ You are interested in numerical methods for engineering.
Course Registration Fees	<p>The participation fees for taking the course is as follows:</p> <p>Student Participants: Rs.1000 Faculty Participants: Rs.4000 Government Research Organization Participants: Rs.6000 Industry Participants: Rs.8000</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</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. E.C.Aifantis is a Professor of Mechanics at Aristotle University of Thessaloniki/GR, Emeritus Professor at Michigan Technological University/USA, Distinguished Research Professor at King Abdulaziz University/SA (formerly) and Distinguished Visiting Expert at ITMO University/RU and BUCEA University/China, as well as Southwest Jiaotong University/China (formerly). He has promoted highly interdisciplinary work in mechanics of materials by bringing into the field of solid mechanics ideas from diffusion theory, chemical reactions, and nonlinear physics. He has pioneered theories on dislocation patterning and material instabilities, gradient elasticity and plasticity, chemomechanics and nanomechanics. His current interest is on neuro-nano-electro-chemo-mechanics



Dr. Sundararajan Natarajan is a faculty member in the Department of Mechanical Engineering at IIT Madras. His research interests lie in the areas of computational solid mechanics and applied mathematics.

Course Coordinator

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