

About **Prof. J. N. Reddy**

Prof. JN Reddy is a Distinguished Professor and inaugural holder of the Oscar S. Wyatt Endowed Chair in Mechanical Engineering at Texas A&M University, College Station, Texas, USA. Prof Reddy has authored over 450 journal papers and 16 text books on theoretical formulations and finite-element analysis of problems in solid and structural mechanics (plates and shells), composite materials, computational fluid dynamics, numerical heat transfer, and applied mathematics. He is internationally known for his research on mechanics of composite materials and for computational methods. The shear deformation plate and shell theories that he developed and bear his name in the literature are well known, and finite element models he developed have been implemented into commercial software like ABAQUS, NISA, and HYPERFORM. Such an eminent record of research has earned Prof Reddy numerous national and international awards, including the Charles Russ Richards Memorial Award and the Worcester Reed Warner Medal of the American Society of Mechanical Engineers. Prof Reddy presented the prestigious 'The 2009 Landis-Epic Lecture' at the University of Pittsburgh, and received Honoris Causa, Honorary degree, from the Technical University of Lisbon, Portugal. Dr JN Reddy can be contacted by email on [jn\\_reddy@yahoo.com](mailto:jn_reddy@yahoo.com) and [jnreddy@tamu.edu](mailto:jnreddy@tamu.edu)



About **Dr. A. Rajagopal**

Dr. A. Rajagopal is an Assistant Professor, Dept. of Civil Engineering, IIT Hyderabad.

Dr. A. Rajagopal's research expertise is on computational in elasticity, finite element and mesh free methods. Earlier to joining IIT Hyderabad he worked as a post doctoral researcher at the Chair of applied mechanics, University of Erlangen, Nuremberg, Germany, under the guidance of Prof. Paul Steinmann. During this time he has worked in the area of polygonal finite element and mesh free methods applied to nonlinear gradient elasticity and phase field simulations. Earlier he has obtained his PhD from IIT Madras, on developing Finite Element Mesh adaption techniques based on mechanics of material / configurational forces for plane problems, bimaterial interfaces and composite plates under guidance of Prof. C.S. Krishnamoorthy and Prof M. Sivakumar. He has authored several papers in these areas in leading journals



About **Dr. Saidi Reddy Parne**

Dr. P.S. Reddy is an Assistant Professor of Physics at NIT Goa.

Dr. P. S. Reddy's research expertise is on Sensors, Photonics and Renewable energy. Prior to joining NIT Goa, he worked as a sensors specialist at Pricol Technologies limited, Coimbatore. He has obtained his Ph. D from NIT Warangal. He has authored several papers in these areas in reputed journals.



## About NIT Goa

The National Institute of Technology Goa (NIT Goa) is a premier technical Institute of the region. NIT Goa was established in the year 2010 by an act of parliament (NIT act 2007) and it is declared as 'Institute of National Importance'. NIT Goa is an autonomous institute and functioning under the aegis of Ministry of Human Resource Development (MHRD), Govt. of India. The campus is located at Farmagudi, Ponda approximately 29 km southeast of Panaji, the capital of Goa and it is a temporary campus. The state of Goa is well connected by road ways, rail ways and air ways with various parts of the country.

The Institute offers Under-Graduate and Post-Graduate courses in three Engineering Departments: (1) Computer Science and Engineering (2) Electronics and Communication Engineering and (3) Electrical and Electronics Engineering. The Institute also offers Ph.D in all the three above mentioned engineering departments. Along with that the Institute offers Ph.D in Mechanical Engineering, Physics, Chemistry, Mathematics, Economics and English.

The Institute admits students into the B.Tech degree program on the basis of ranks obtained in the Joint Entrance Examination JEE(Main) and the scheme of Direct Admission to Students Abroad (DASA) with an intake of 30 students in each branch. The institute is sincerely attempting to deliver quality education and to achieve excellence in teaching, learning and research with high professional ethics. For M.Tech Programme, the Institute admits students through valid GATE score followed by CCMT (Centralized Counselling for M.Tech Admissions). Each department is offering 20 seats for the said programme, out of which 18 seats will be filled up through CCMT and the remaining 2 seats are meant for the sponsored candidates.

For more details please contact:

**Dr Saidi Reddy Parne**  
Coordinator - GIAN Course on ACM

To Register for the course, visit:  
<http://www.nitgoa.ac.in/gian>



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## GLOBAL INITIATIVE ON ACADEMIC NETWORK

10 Days Course on

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## Overview

Many of the mathematical models of natural phenomena are based on fundamental scientific laws of physics or otherwise, extracted from centuries of research on the behavior of physical systems under the action of natural forces." Today this subject is referred to simply as mechanics - a phrase that encompasses broad fields of science concerned with the behavior of fluids, solids, and complex materials. Mechanics is vitally important to virtually every area of technology and remains an intellectually rich subject taught in all major universities. It is also the focus of research in departments of Aerospace, Chemical, Civil, and Mechanical engineering, Engineering Science and Mechanics, as well as applied mathematics and physics. The last several decades have witnessed a great deal of research in continuum mechanics and its application to a variety of problems. As most modern technologies are no longer discipline-specific but involve multidisciplinary approaches, scientists and engineers should be trained to think and work in such environments. Therefore, it is necessary to introduce the subject of mechanics to senior undergraduate and beginning graduate students so that they have a strong background in the basic principles common to all major engineering fields. A course on continuum mechanics is the one that provides the basic principles of mechanics and prepares engineers and scientists for advanced courses in traditional as well as emerging fields such as biomechanics and nanomechanics.

## Objectives of the Course

The objective of the course is to facilitate an easy understanding of the basic concepts of continuum mechanics with applications to elasticity, fluid mechanics, and heat transfer. The course presents the main concepts of continuum mechanics in easy to understand fashion yet mathematically rigorous enough in providing the invariant form as well as component form of the governing equations for analysis of practical problems of engineering. In particular, the course contains formulations and applications to specific problems from heat transfer, fluid mechanics, and solid mechanics.

This course is intended to provide graduate students, engineers, and researchers from different disciplines (e.g., Aerospace, Automotive, Civil, Mechanical engineering, Applied physics and Mathematics) as well as materials scientists with the theory and applications of applied continuum mechanics concepts.

## Who can attend?

The course is aimed at students and researchers who are involved with the formulation and analysis of problems arising in the fields of engineering and applied science. Participants are assumed to have knowledge of the basic courses of engineering (i.e., an undergraduate degree in engineering or equivalent). Prior knowledge of mechanics of materials, statics, and dynamics is an advantage, but not essential.

## Benefits of attending the course

Persons who have attended the course and followed the material well should benefit in strengthening their background in the following areas

- A strong understanding of the fundamental concepts of the measures of stress, strain, and constitutive models.
- In-depth understanding of the physical principles of engineering (conservation of mass and balance of linear and angular momentum and energy).
- Solution of boundary-value problems of elasticity, fluid mechanics, and heat transfer.

## Evaluation and Grading

There will be 3 evaluations on the understanding of the concepts by the participant made during the course. Based on the evaluations finally a letter grade will be awarded to the participant. A completion certificate shall also be issued.

## Course Contents

### Mathematical Preliminaries

- Vector Algebra and Calculus
- Second order tensors
- Coordinate Systems and the Del Operator
- Index notation, principal values of second-order tensors

### Descriptions of motion Kinematics deformation Green and Euler strain measures

### Measures of stress

- Stress vector
- Stress tensor
- Cauchy's formula
- Principal values of stress and strain and principal planes

### Conservation of mass

- Eulerian and Lagrangian forms in vector and component forms

### Conservation of linear momentum in vector and component forms Conservation of angular momentum in vector and component forms Conservation of energy in vector and component forms Derivation of field equations in cylindrical and spherical coordinate systems

### Constitutive models

- Generalized Hooke's law
- Fourier heat conduction law
- Newtonian fluids

### Linearized elasticity

- Classification of boundary value problems
- Formulation of boundary value problems of elasticity and their solution
- Newtonian fluids

### Applications to heat transfer

- Simplification of equations and applications
- Formulation and solution of 1D and 2D heat transfer problems (separation of variables of technique)
- Newtonian fluids

### Applications to fluid mechanics

- Formulation of some standard problems of fluid mechanics
- Formulation and solution of fluid mechanics problems
- Newtonian fluids

### Prelude to advanced topics and Recent advances

|                                       |                     |
|---------------------------------------|---------------------|
| Last date for receiving applications: | 10 December 2016    |
| Intimation to participants:           | 10 December 2016    |
| Course Dates:                         | 15-25 December 2016 |

### Important Dates

### Registration Fee

The participation fees for taking the course is as follows:

|  |            |
|--|------------|
| Participants from abroad :                         | US \$500   |
| Participants from Industry:                        | Rs. 8000/- |
| Participants from Academic/Research Organisations: | Rs 7,000/- |
| Students and research scholars:                    | Rs.2000/-  |
| (For SC/ST students: Rs. 1000/-)                   |            |

The above fee includes all instructional materials, computer use for tutorials and assignments, laboratory equipment usage charges and free internet facility.

**The participants will be provided with accomodation and food on payment basis.**

Payment should be made in the form of Demand Draft to be paid in favor of "The Director, NIT Goa". The DD together with registration form should be sent to

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