

Instructors

Dr. Gangadharan,
Assistant Professor, Department of
Mechanical & Aerospace Engineering, IIT H

Dr. Gangadharan's research expertise is on analysis and design of composite structures, wave propagation in structures and structural health monitoring. He focuses on the numerical modeling aspects of composites.

Dr. S. N. Khaderi
Assistant Professor, Department of
Mechanical & Aerospace Engineering, IIT H

Dr. Khaderi works in the domain of computational solid mechanics with emphasis on multi-physics and fluid-structure interaction problems. His present focus is on the impact/blast loading of materials and phase field modeling of fracture.

Dr. M. Ramji
Associate Professor, Department of
Mechanical & Aerospace Engineering, IIT H

Dr. M. Ramji's research expertise is on composite repair, fundamental fracture studies, high temperature material testing, computational fracture and damage mechanics. He focuses on mechanics of repair aspects applicable to composite structures involving digital image correlation.

Dr. Viswanath Chinthapenta,
Assistant Professor, Department of
Mechanical & Aerospace Engineering, IIT H

Dr. Viswanath R Chinthapenta research area is Computational Material Mechanics at a large. His current focus is on deformation in Nano crystalline materials, Multiscale modelling of composites, SHM: Spectral time domain FEM and Constitutive modelling of soft materials.

CONTACT DETAILS OF CONVENER

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DATE AND VENUE

The short course is proposed to be held at IIT Hyderabad, Yeddumailaram, Telangana during July 23-25, 2015. IIT-Hyderabad is located in its temporary premises in the quiet residential campus of Ordnance Factory Medak (OFMK) at Yeddumailaram, about 50 km from the heart of Hyderabad city. The requisite infrastructure, namely hostels, classrooms, offices, recreation, sports and medical facilities, are all located within the OFMK Estate. The permanent campus is being constructed and is located on the National Highway 9 at Kandi village (near Sangareddy town, Telangana).

ABOUT IIT HYDERABAD

Inventions and innovations are key words on which the foundation of IITH is based. One of India's eight new IITs – IITH started functioning in August 2008. With a current strength of 150 faculty and 1800 students, IITH offers B.Tech program in eight disciplines, M.Tech in nine disciplines, M.Sc in three disciplines and Ph.D in 12 disciplines. IITH develops state-of-the-art infrastructure for advanced research and has produced over 100 publications in internationally reputed journals. Research is a culture among the faculty

and students of IITH. This is evident from the 25 research projects ranging from Rs 18 lakhs to Rs 18 crores that are ongoing at IITH. On top of the gamut of sponsored projects from various funding agencies, IITH has active collaboration with industry as well. IITH also has an innovative academic program where the students are offered fractional credits and the first semester undergraduates are allowed to do a project of their choice. Many more innovations in the academic front are in the offing. IITH always strives to offer an innovative environment where one is not afraid to experiment with high-risk ideas.

The Department of Mechanical and Aerospace Engineering aims at pushing the frontiers of modern science and engineering through developing cutting edge technologies. The faculty collaborate with companies and organizations working in strategic sectors. All of them are at the foremost in their field of research. Major areas of faculty expertise includes Vibration, Dynamics, Mechatronics, CFD, IC Engines, Solid Mechanics, Composites, Fracture Mechanics, Rapid Prototyping, CAD/CAM/CAE, MEMS, NEMS.



Mechanical and Aerospace Building in Kandi Campus

Short Course On Fundamentals of FEM: Overview, Theory and Concepts with Demonstrations

July 23rd - 25th, 2015
IIT Hyderabad



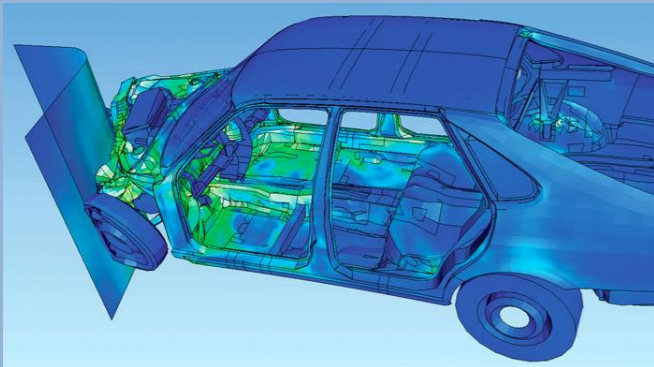
Convener:

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Department of Mechanical &
Aerospace Engineering
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Telangana 502205
India

<http://www.iith.ac.in/~fem2015>

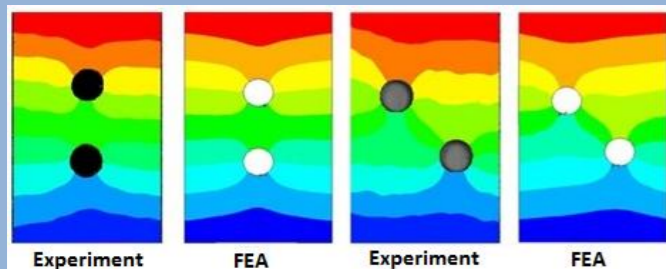
BACKGROUND

The finite element method is a commonly used numerical tool that is used for the solution of differential equations. Such differential equations arise, during analysis of the structural integrity of mechanical components subjected to various kind of loading. For example an aircraft's landing gear subjected to dynamic loading during landing and take-off.



Complex problems such as coupled-field interactions, contact stress analysis, metal forming, fluid-structure interaction, for which obtaining closed form solution is very difficult, can be solved with a modest effort using FEM.

The success of the FEM in predicting the experimental observations has led to the availability of a number of commercial finite element software and a wide spread use in sectors such as nuclear, defense, marine, automobile and aerospace.



WHO SHOULD ATTEND?

This short course is for all industry and research professionals involved in stress analysis of components using Finite Elements. Engineers and designers in both private and public practice will benefit. This course will provide an excellent exposure on theory and concepts of FEM along with hands on experience on example problems to young scientists, research scholars and teachers at the universities and private engineering colleges.

LEARNING OUTCOMES

This short course is aimed at providing an overview of finite element analysis as numerical analysis tool. We will focus on the following aspects:

- Introduction to FEM
- Formulation methodologies
- Basics of interpolation theory
- Iso-parametric formulation
- Static, Transient and Harmonic analysis
- FEA of Composite structures
- Special topics: Fatigue , Fracture and Repair

COURSE CONTENTS

Day 1: Introduction and overview, Method of Weighted Residuals to solve 1D Problems. FE formulation for 1D Bar and Beam: Interpolation theory, numerical integration schemes, natural coordinates, development of element stiffness, assembly and solution & post processing. Demonstration using MATLAB, ABAQUS/ANSYS.

Day 2: 2D Formulation for plane stress, plane strain, and Axisymmetric problems.

Completeness, Convergence (h and p) and Compatibility, Element Libraries, User subroutines. Iso parametric formulation and quadrature scheme. Demonstration in MATLAB, ABAQUS/ANSYS. 1D bar Transient analysis, wave propagation (explicit and implicit) and vibration analysis (harmonics and mode shapes).

Day 3: Advanced Topics-Composite theory and FE analysis. Fatigue & Fracture, repair analysis using FE.

COURSE MATERIAL

A copy of selected presentation material of the course will be provided along with other useful references and case studies.

REGISTRATION FEES

Application for participation in the short course may be sent in the attached proforma along with the registration fee to Dr. S. N. Khaderi. Applications should reach us before 15 July, 2015. The fee should be remitted by a crossed demand draft in favor of "IIT Hyderabad" payable at state bank of India. Rs. 21000/- per participant.

Travel, boarding and lodging expenses of the participants will have to be borne by the participants or their sponsoring organizations. A limited accommodation is available at the IIT-H guest house. Therefore, participants, who wish to avail this facility, are advised to write to Dr. S. N. Khaderi well in advance, and in any case, not later than 15 July, 2015. The registration fees include working lunch, refreshments and dinner.

A Short Course On Fundamentals of FEM: Overview, Theory and Concepts with Demonstrations

July 23rd -25th, 2015

REGISTRATION FORM

Personal Information:

Name: _____

Designation: _____

Organization: _____

Mailing Address: _____

Phone: _____

Email: _____

Registration Fee:

Enclosed is a crossed draft no.....Dated.....

For Rs..... In favor of "IIT-Hyderabad", payable at State Bank of India, Hyderabad. Also, payment may be made directly to IIT-Hyderabad using Electronic Bank Transfer using the following details

Bank Name : State Bank of India

IIT Kandi: (Branch code: 14182) Hyderabad

SWIFT Code: SBIN0014182

Account No.: 30859878032 (Current A/c)

<http://www.iith.ac.in/~fem2015>