

11. Conferences attended in the past five years

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12. Earthquake engineering related activities pursued by the applicant in past 5 years:

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13. Other activities that show candidate's interest in Earthquake Engineering

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Signature:  
Name:

Recommendation of the Head of the Institution

Signature:  
Name:

Date:  
Designation:  
(With Seal)

### Other Participants

Industries and Government departments desirous of utilizing this opportunity may depute participants at their own expenses. A course fee of Rs. 10,000 (Rupees ten thousand only) in the form of crossed DD payable to "Registrar, Indian Institute of Science Bangalore 560012" should be paid by such participants. Only five participants on a first come first served basis will be selected under this category.

#### For further details please contact

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Indian Institute of Science,  
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Prof C S Manohar is the coordinator for NPEEE activities at the Indian Institute of Science. For more general information about NPEEE, please see website: <http://www.nicee.org/npeee> or Email: [npeee@iitk.ac.in](mailto:npeee@iitk.ac.in)

#### Please mail applications to:

Assistant Registrar,  
Centre for Continuing Education  
Indian Institute of Science, Bangalore-560012  
Tel: 080-3600911, 2932491  
Fax: 080-3600911  
Email: office@cce.iisc.ernet.in

#### Important Dates:

Last date for receiving applications: 3<sup>rd</sup> November 2006  
Date for Intimation of Selections: 10<sup>th</sup> November 2006

## SHORT TERM COURSE

ON

The Finite Element Method in  
Structural Dynamics and  
Earthquake Engineering

**December 4-9 2006**

#### Course Coordinator

**Professor D Roy**

Department of Civil Engineering

#### **Sponsored by**

Ministry of Human Resource  
Development, Govt. of India  
National Programme on Earthquake  
Engineering Education



Centre for Continuing Education  
INDIAN INSTITUTE OF SCIENCE  
BANGALORE - 560012  
INDIA

### Prelude

Engineering educators and practitioners must take recourse to a rational approach towards modeling and analyses of structures under earthquake loads. In order to have a unified understanding and appreciation of the mechanics of ground motion and its effects as they propagate through complex structural elements, one must have an adequate background in finite elements as applied to problems in structural dynamics and, in particular, earthquake engineering. This short term course thus aims to provide a unified treatment of the two broad topics on the finite element method and structural dynamics (with applications to earthquake engineering) under one umbrella. Without getting into a detailed theoretical account of the topics, an attempt will be made to bring into focus the applicability and relative importance of the topics for a better understanding of the mechanical behaviour under earthquake excitations. Accordingly, the focus will be to impress upon, through examples, why a unified usage of the ideas drawn from these subjects provides a more rational and complete basis to understand and quantify the seismic hazards – right from the identification and characterization of earthquake sources to the assessment of structural performance against potential earthquakes. Tutorials and computer demonstrations will be used to shore up confidence and ignite further interest of the participants in the material covered.

### Participants

Teachers of recognized engineering colleges are eligible to apply for the course. For these participants there is no course fee. Selected participants will be given the course materials and will be provided with free lodging in the Hoysala Guest House of IISc. The number of participants for the course will be limited to 25-30.

### Objectives

- To highlight the role of finite elements in modeling and analyses of structural systems of interest in the broad area of earthquake engineering.

- To focus on the usage of FE-based methods in understanding the dynamic behaviour of structures under earthquake excitations.
- To provide an understanding on the quality of solutions via FE methods.

### Course Contents

- Elements of calculus of variations; weighted residual approximations; trial functions; finite element concepts; virtual work and weak formulations; structural matrices for beam, plane stress, plane strain, plate, shell and 3D solid elements; Co-ordinate transformations and assembly of structural matrices. (2 days, 15 hours).
- Elements of structural dynamics: Dynamics of SDOF systems; Normal modes; Uncoupling of equations of motion; damping models; Response spectra. Modal combination rules; Corrections for residual modes Numerical integration of equations of motion. (2 days; 15 hours)
- Applications: Dynamics of building frames, bridges and dams under earthquake excitations; Response analysis with earthquake loads specified as time histories and as a set of SDRS. (1 day, 8 hours)

### Course material

A volume of the set of lecture notes/Presentation slides would be provided to all the participants.

### Resource Faculty

Profs. D Roy, C S Manohar, and B K Raghu Prasad

### Travel and Stay

Return train fare by 3-tier AC and free stay on the campus of IISc will be provided for the selected out-station (non-local) participants. In addition a per diem of Rs. 150 will be provided for seven days to cover food and other expenses.

### Venue and Time

Lectures will be held in the central lecture hall complex, Center for Continuing Education, IISc. The inauguration will be at 9.30 AM on 4<sup>th</sup> Dec, 2006. The course will end with a written test and feed-back session on 9<sup>th</sup> Dec, 2006.

### Official Language

The official language of the short-term course will be English.

## Course on FE Methods in Structural Dynamics and Earthquake Engineering

Application form for teachers to participate in training programme (Use additional sheets if necessary)

1. Name:
2. Designation:
3. Name of College/Institution:
4. Address:

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5. Phone (Office): \_\_\_\_\_  
Phone (Home): \_\_\_\_\_
6. Email: \_\_\_\_\_
7. Qualifications:

Year	Degree	Specialization	University

8. Thesis titles (if applicable)

M.E./ MTech:

Ph.D:

9. Courses taught in the past five years:

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10. Short courses attended in the past five years:

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