

## ABOUT THE VENUE

IIT Roorkee is situated at the foothill of the Himalayas, in Haridwar district, within the state of Uttarakhand. It is a quiet town of moderate size located on the banks of the upper Ganga Canal, which takes off at Haridwar, 30km away. It is the gateway to the pilgrim centres of Haridwar, Rishikesh, Badrinath and Kedarnath, and tourist destinations of Dehradun and Mussoorie. It is well connected to Delhi by rail and road.

## CLIMATE

Roorkee enjoys a pleasant climate during March-April when temperature rarely goes above 30 and occasional shower may bring chilly weather. Therefore, summer clothing, light woollens and an umbrella are recommended for a comfortable stay at Roorkee.

## ACCOMODATION

The course participants would be provided with accommodation in well furnished Guest Houses located within the sprawling campus of IIT Roorkee.

*For details contact:*



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# SAARC Training Programme on EARTHQUAKE RISK MITIGATION

May 12-18, 2010

for  
Geoscientists/Civil Engineers/Architects & Planners/  
Disaster Management Professionals

Organized by  
SAARC Disaster Management Centre,  
New Delhi (India)

In collaboration with  
Centre of Excellence in Disaster Mitigation & Management,  
Indian Institute of Technology, Roorkee (IIT-R),  
Roorkee, Uttrakhand (India)

## **PURPOSE**

South Asia is highly vulnerable to earthquakes due to presence of active seismic source regions of world. Out of eight SAARC countries, six are located in this active belt (Afghanistan, Bangladesh, Bhutan, India, Nepal and Pakistan). Many of the important and densely populated cities of these countries including the capital cities of Kabul, Dhaka, Thimphu, Delhi, Kathmandu and Islamabad are located in moderate to severe seismic hazard zones. Liquefaction and seismically induced landslides further add to the seismic hazard of the region. Many of the prevalent construction practices and building typology result in dwelling units that are extremely vulnerable to earthquake hazards.

Therefore, in the past SAARC countries have experienced severe losses in terms of human casualty and property; most notable are the Bhuj earthquake of 26 January, 2001; Sumatra Earthquake of December 26, 2004 leading to Tsunami and Kashmir earthquake of 8 October 2005. Most of the casualties were due to collapse of poorly constructed buildings in geologically vulnerable regions. Earthquakes do not kill people but poorly designed or constructed buildings do. The devastation during past earthquake have clearly brought out the need to have comprehensive strategy for earthquake mitigation which should include proper assessment of seismic hazard and planning, design and construction of earthquake resistant buildings through strict compliance of code provisions. As of today, it is unfortunate that in spite of having all the scientific know-how in the field of earthquake engineering and the Code provisions for construction in seismic areas we continue to find that our engineers and builders are not following these either due to ignorance or fear of added cost. Common people are not aware of many aspects of earthquake disaster and better building practices in seismic high hazard zones of the South Asia. The problem is further aggravated by inappropriate land use planning due to lack of knowledge on geology and geotechnical condition of the region.

Therefore, it is proposed to organize a one week short term training program at IIT Roorkee so as to train Architects, Town Planners, Structural Engineers and all stakeholders of SAARC countries to acquaint them about the current practices of hazard assessment, safe construction, code provisions etc. This will also provide an opportunity to all stakeholders to share experiences on this important issue of earthquake hazard assessment, mitigation methods, relief and rehabilitation measures undertaken in recent times.

## **COURSE OBJECTIVES**

The main objective of the training course is to train stakeholders (particularly dealing with geology/geophysics, construction/ engineering, disaster management) from SAARC countries

about assessment of earthquake hazard and vulnerability of buildings and immediate need to adopt different mitigation measures, exchange of knowledge and sharing of best practices on earthquake resistant design, construction and other mitigation measures.

## **THE TRAINING COURSE**

The course will be conducted by Centre of Excellence in Disaster Mitigation & Management, and Department of Earthquake Engineering, IIT Roorkee wherein lectures and practicals will be delivered by experienced faculty members from Earthquake Engineering Department, Earth Sciences Department, IIT-Roorkee and SAARC Disaster Management Centre (SDMC). Other resource faculty members may be drawn from Geological Survey of India, Wadia Institute of Himalayan Geology (WIHG), etc. Participants will be exposed to practical problems and they will have hands on experience on seismic hazard mitigation measures. It is hoped that the course will be very useful for all stake holders in the area of Earthquake Disaster Mitigation.

## **WHO SHOULD ATTEND**

Engineers/ Architects/ Geoscientists/ Planners and stake holders (particularly dealing with geology/geophysics, construction/ engineering, disaster management) who are involved in earthquake disaster mitigation activities in member countries can attend this course. It is also useful for teachers and research scholars working in this area.

## **DURATION OF COURSE**

Course duration is 6 days consisting of daily two lectures of 1½ hr duration and practical sessions in the afternoon.

## **COST OF COURSE**

There is no course fee for government sponsored candidates from member countries. However, as per the SAARC Harmonized Provisions for the Regional Centres, the travel expenses for the participants shall be borne by the member countries whereas local hospitalities like hotel accommodation, food and local transport shall be borne by the SAARC Disaster Management Centre.

## **COURSE CONTENTS**

- Ø **Seismic Hazard, Risk and Vulnerability Assessment:**
  - i. Engineering Seismology, Seismotectonics and Seismic Hazard in South Asia
  - ii. Concept of Seismic Zones, Risk and Vulnerability assessment
  - iii. Seismic Microzonation

### Ø **Secondary Seismic Hazards**

- iv. Seismically Induced Landslide Hazard Analysis
- v. Liquefaction Susceptibility Studies

### Ø **Earthquake- Resistant Design and Construction**

- vi. Performance of Masonry & RC Buildings During Earthquakes
- vii. Dynamics of Vibrating Structures
- viii. Earthquake Resistant Design and Construction
- ix. Earthquake Resistance Measures in Masonry Buildings
- x. Pushover Analysis of RC Frame Buildings
- xi. Ductility Provision for Better Seismic Performance
- xii. Seismic Vulnerability Assessment & Retrofitting

### Ø **Techno-legal Aspects: Codes & Building Bye-Laws**

### Ø **Earthquake Response, Recovery, Rehabilitation – Case Studies**

### Ø **Field visits to demonstrate activities related to retrofitting/Earthquake Resistant Structure**

### Ø **Solution of a Practical Problem**

## **EXAMINATION AND CERTIFICATE**

At the end of the training course, participants will have to undertake a one and half hour examination and all successful candidates will be awarded with Certificates.

## **LANGUAGE**

Teaching medium is English and all course materials will be provided in English only.

## **ABOUT THE ORGANISERS**

### **SAARC DISASTER MANAGEMENT CENTRE**

SAARC Disaster management Centre was set up in 2006 at the premises of National Institute of Disaster Management in New Delhi. The centre has the mandate to serve eight Member countries of South Asian Association for Regional Cooperation (SAARC), Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka - by providing policy advice and facilitating capacity building services including strategic learning, research, training, system development and exchange of information for effective disaster risk reduction and management in South Asia. It carries out studies research, organizes workshops and

training programme, publishes reports, documents and provides various policy advisory services to the Member Countries.

## **THE CENTRE OF EXCELLENCE IN DISASTER MITIGATION AND MANGAGEMENT, IIT ROORKEE**

A Centre of Excellence in Disaster Mitigation and Management was established at IIT Roorkee in March 2006 for national capacity building in Disaster Mitigation and Management. The Centre has the following objectives.

- Ø National capacity building in Disaster Mitigation through Human Resource Development
- Ø Dissemination of technical know-how by conducting short term courses in Disaster Mitigation & Management
- Ø Dissemination of technical know-how to meet the challenges arising of disasters through consultancy services
- Ø Minimize the impact of natural disasters through R & D and extension activities by providing engineering solutions in the area of Disaster Mitigation
- Ø Evolving strategies for mitigation and management of disasters and establishment of national technical data base for rapid dissemination of information and knowledge
- Ø Conduct research in related areas leading to Ph.D. degree in Disaster Mitigation and Management

The major participating Departments in the Centre are:

- (i) Department of Earthquake Engineering;
- (ii) Department of Civil Engineering;
- (iii) Department of Earth Sciences;
- (iv) Department of Hydrology

## **THE DEPARTMENT OF EARTHQUAKE ENGINEERING, IIT ROORKEE**

The Department of Earthquake Engineering, established in 1960 as School of Research and Training in Earthquake Engineering. The Department has provided yeomen service in teaching, research, training and rendered advice in the field of Earthquake Engineering for the last 50 years (1960-2010). The Department has four main sections,

- (i) Seismic Instrumentation,
- (ii) Engineering Seismology and Seismotectonics,
- (iii) Soil Dynamics and
- (iv) Structural Dynamics. It runs two M.Tech programs in Earthquake Engineering with specialization in Structural Dynamics and Soil Dynamics. This SAARC training course is a part of our **Golden Jubilee Celebration** of the Department of Earthquake Engineering.



**SAARC Training Programme on  
EARTHQUAKE RISK MITIGATION**

**May 12-18, 2010 at Centre for Continued Education, IIT Roorkee, Uttrakhand (India)**

Name: \_\_\_\_\_

Date of Birth: \_\_\_\_\_ Sex: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

Email: \_\_\_\_\_

Passport details No: \_\_\_\_\_ Place of Issue \_\_\_\_\_

Date of issue \_\_\_\_\_ Date of Expiry \_\_\_\_\_

Education qualification: \_\_\_\_\_

Current responsibility in the organization:- \_\_\_\_\_  
\_\_\_\_\_

What Way the proposed training will help your organization? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Organization Address \_\_\_\_\_  
\_\_\_\_\_ Phone \_\_\_\_\_ FAX \_\_\_\_\_

Sponsoring authority (name with signature): \_\_\_\_\_  
\_\_\_\_\_

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