



भारतीय प्रौद्योगिकी संस्थान गुवाहाटी Indian Institute of Technology Guwahati

Short Term Course



Quantification of Seismic Hazard and Mitigation of Induced Effects in NER

8-9 November 2019

**Conducted by:
Department of Civil Engineering**



**Organized by:
Knowledge Incubation for TEQIP
Centre for Educational Technology
URL: <http://www.iitg.ac.in/cet>**

PRELUDE

Earthquake is one of the nature's most severe hazards that occurs without a warning and has the potential to devastate the society instantaneously. North-eastern part of India is seismically very active, and therefore, this region has been placed in the highest seismic zone by the Indian seismic code. High seismic activity of this region can be evidenced from the large number of earthquakes that have occurred in this Himalayan region. Some of the most damaging and notable earthquakes to have struck this region are: 1869 Cachar ($M_w 7.5$), 1897 Assam ($M_w 8.1$), 1923 Meghalaya ($M_s 7.1$), 1930 Dhubri ($M_s 7.1$), 1943 Assam ($M_s 7.2$), 1947 Arunachal Pradesh ($M_s 7.7$), 1950 Assam ($M_w 8.7$), 1988 Manipur ($M_s 7.3$), 2009 Assam ($M_w 5.1$), and 2011 Sikkim ($M_w 6.9$). This clearly demonstrates the high seismic hazard associated with the north-eastern part of India. Considering the seismic activity of north-eastern India, numerous researchers tried attempting the quantification of seismic hazard in the region and development of mitigation measures against induced effects, such as, damage due to excessive ground shaking, liquefaction, landslides, etc. The problem becomes more critical in hilly regions due to haphazard construction practice adopted by the people. Faster growing population in the Himalayan region has led to the rapid urbanization, unplanned construction, reclamation of natural water bodies, etc. which in turn has led to a significant rise in the risk of earthquake induced damage in future.

ABOUT THE COURSE

The entire north-eastern India is seismically very active and is undergoing repetitive moderate to major earthquake induced damages. Keeping in mind the Government of India's focus to develop the north-eastern part of India through *Act East Policy*, it is important to not only accurately assess the seismic hazard and its induced effects in this region, but also to suggest mitigation measures for sustainable development and growth. This workshop is an attempt to create an environment for brainstorming this issue with several experts in earthquake engineering, structural engineering, geotechnical engineering, and engineering seismology from different institutes across the country. This will help in understanding the seismic hazard of the region and to suggest mitigation measures in view of several limitations, for example, limited availability of ground motion records, limited information about historical earthquakes, known seismic sources, ongoing geomorphological changes as well as the effect of each of them on current and future seismic hazard of different parts of north-eastern India.

PANEL DISCUSSION/ BRAINSTORMING SESSION

Keeping in mind the seismicity of NER, a dedicated panel discussion will be conducted to brainstorm on the disaster preparedness and mitigation issues. Eminent national experts will share their perspectives and help paving the way forward for seismic risk reduction in the NER. Various approaches for mitigation of possible-seismically induced effects in NER will be dwelt-upon.

COURSE CONTENT

- Introduction to seismic hazard and induced damages.
- Seismic wave attenuation and local site effects.
- Seismic source characterization and determination of seismic activity.
- Assessment of deterministic and probabilistic seismic hazard.
- Development of Indian seismic hazard map and microzonation.
- Concept of earthquake resistant design and importance of ductile detailing.
- New Codal provisions on seismic design and detailing of RC structures
- Seismic fragility and risk assessment.
- Determination of liquefaction hazard.
- Landslides and related hazards.
- Earthquake hazard mitigation.

TOPICS TO BE COVERED

- Seismic source characterization
- Seismic hazard assessment
- Seismic microzonation
- Seismic design and detailing using new codes
- Site response analysis
- Seismic fragility and risk assessment
- Liquefaction assessment
- Landslide assessment
- Earthquake hazard mitigation

ELIGIBILITY

The course is open to faculty members and students from TEQIP mapped Institutions/Engineering Colleges/Affiliating Technical Universities (ATUs). TA and DA for these eligible participants will be reimbursed from their respective institutions.

Faculty members, students, engineers, and others working in Non-TEQIP mapped institutions and industries are also welcome to attend the course by paying the registration fee as follows:

Students: Rs. 7500/- (non-refundable)

Others: Rs. 15000/- (non-refundable)

The fee includes overhead charges, course kit, lecture notes, refreshment and lunch during the course, lab visits.

BOARDING AND LODGING

Boarding and lodging facilities (Guest House rooms on shared basis/Hostel rooms or other permissible accommodation) will be provided to the participants from TEQIP mapped institutions. For all other participants, the boarding and lodging will be provided on payment basis.

SELECTION CRITERIA

Number of seats: 30

Selection will be based on first come first served basis subject to the deposition of the registration fee (Rs. 7500/15000) in the form of a demand draft in favor of "Registrar, IIT Guwahati" payable at Guwahati.

IMPORTANT DATES

15/10/2019: Last date of receiving the scanned application and DD (by email)

25/10/2019: Last date of receiving the hard copy of application form and DD

28/10/2019: Intimation of selection

COURSE COORDINATORS

Dr. Abhishek Kumar and Prof. Hemant B Kaushik

Department of Civil Engineering

Indian Institute of Technology Guwahati

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Please send the application form, nomination/sponsorship form, and demand draft by email (scanned copy) as well as postal/courier service to the course coordinators.

WEBSITE

<https://www.iitg.ac.in/abhiak/>

Application Form

1. Name (block letters):

2. Gender: ☐ Male ☐ Female

3. Category: ☐ General ☐ SC ☐ ST ☐ OBC

4. Highest Academic Qualification:

5. Specialization:

6. Designation & pay scale:

7. Name of the organization:

8. Experience:

(a) Teaching:

(b) Industrial:

9. Address for communication:

Mobile No.:

E-mail:

10. Choice of Accommodation: ☐ Guest House

☐ Hostel ☐ Will make my own arrangement

11. DD: Amount Rs._____ No._____ Dated _____

Please register me for the course on **“Quantification of Seismic Hazard and Mitigation of Induced Effects in NER”** to be held at IIT Guwahati.

I am sending an advance soft copy of this application along with a scanned copy of the demand draft by email to the coordinator of the course.

I undertake to send the Hard copy signed by the Head of my Institution along with the original demand draft.

Place:

Date:

Signature of the applicant

SPONSORSHIP / NOMINATION CERTIFICATE

Prof/Dr./Mr./Ms./Mrs./

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is an employee of our institute and his/her application is hereby sponsored/nominated. The applicant is permitted to attend the short-term course **“Quantification of Seismic Hazard and Mitigation of Induced Effects in NER”** at IIT Guwahati during 08/11/2019 to 09/11/2019 if selected.

I also certify that our institute/college is under the “Institution List” of 3rd phase of TEQIP Project of MHRD.

Date

Signature of Authority

Designation

Official Seal

ABOUT TEQIP

TEQIP conceived in pursuance of the NPE-1986 (revised in 1992) by Govt. of India as a long term program to be implemented in different phases. After successful execution of TEQIP II, TEQIP III starts from 2017-18 as Central Sector Scheme with a focus on the Low Income States, Northeast, Hill States and Islands. The third phase of TEQIP is also special in a way that it incorporates twinning arrangements between mentee & mentor institutions with an emphasis on Focused Training (PT) and Focused Interventions from IITs in terms of deliverables and accountability. KIT, established at IIT Guwahati under 2nd phase of TEQIP is a focal point for training Faculty, Staff and students from TEQIP-III institutions in Knowledge Engineering, Content Creation, Improving Teaching, Pedagogy & administrative skills in identified niche areas/disciplines.

ABOUT KIT

KIT (Knowledge Incubation Cell for TEQIP) at IIT Guwahati functions as a multi-disciplinary as well as interdisciplinary Innovation Incubation Centre with a focus to impart Knowledge, infusing innovation and leading a path to achieve academic excellence. Its activities are in the area of improving quality of technical education, incubator of Innovative Ideas; implementer of contemporary pedagogy practices and development of Learning Content in Technical institutions while mentoring them.

ABOUT IIT GUWAHATI

IIT Guwahati campus is spread over a sprawling 785 hectares plot of green land on the north bank of the river Brahmaputra around 25 km from the heart of the city. With hills and vast open spaces, the campus provides an ideal setting for training.

The Department of Civil Engineering since its formation is committed to research and development in Societal Infrastructure. The vision of the department is to give an exposure to Civil Engineers to various challenges in the profession. The department offers courses at B.Tech., M.Tech. and Ph.D. programs. The main areas of research include Earth System Science and Engineering, Environmental Engineering, Geotechnical Engineering, Infrastructure Engineering and Management, Structural Engineering, Transportation Engineering and Water Resources Engineering. The department also provides consultancy services for challenging infrastructure projects.

Details on how to reach IITG Campus are available on the institute website:
www.iitg.ac.in