

# GIS and Remote Sensing for Natural Hazard and Risk Assessment

16 February – 14 May 2004



The impact of natural disasters (earthquakes, floods, windstorms, landslides etc.) to the global environment is becoming increasingly severe over the last decades. The reported number of disasters has dramatically increased, as well as the cost to the global economy and the number of people affected.

The international community has become aware of the necessity to increase the work on disaster mitigation. In order to carry out effective measures for risk reduction, information should be available on the hazards that threaten a certain area, the elements at risk (population, buildings, infrastructure, economic activities) that are exposed to these hazards, the vulnerability of these elements at risk and an estimation on the expected losses and risk. Hazard, vulnerability and risk assessment is a complex task, requiring a large amount of spatial data. Many of the input data can be obtained using remote sensing. For hazard modelling and risk analysis the use of geographic information systems (GIS) is indispensable. This course teaches the applications of remote sensing and GIS for natural hazard and risk assessment, with case studies from different countries.

## Target groups

This course is designed for: technical staff from disaster management organizations, environmental agencies, universities, NGO's, and private sector, with a BSc in earth sciences, environmental sciences, civil engineering, urban or regional planning or other disciplines related to natural hazards and risks.

## What will be achieved?

Upon completion, the participants will be able to:

- recognise various types of natural hazards (earthquakes, volcanic eruptions, landslides, flooding and coastal hazards), and quantify their impact using GIS modelling;
- identify the main controlling factors for natural hazards, and formulate a plan how to collect data on different scales, using remote sensing;
- extract relevant information from aerial photographs, satellite images and combine it with other data in a GIS;
- use satellite images and digital elevation data for the monitoring of hazardous processes;
- use geographic information systems for the analysis of hazard, vulnerability and risk;
- get acquainted with examples of risk assessment and disaster management in various organisations in the Netherlands;
- apply risk information in risk reduction measures, land-use planning, and emergency response planning.

## Course content

The course comprises 4 modules, each of a 3 week duration.

Module 1:

deals with the use of remote sensing and GIS for hazard assessment and monitoring of coastal and flooding hazards. Use will be made of different types of remote sensing data, ranging from high temporal resolution to high spatial resolution

Module 2:

deals with the use of remote sensing and GIS for geological hazard assessment, with emphasis on earthquakes, volcanic eruptions and landslides. GIS modelling will play an important role

Module 3:

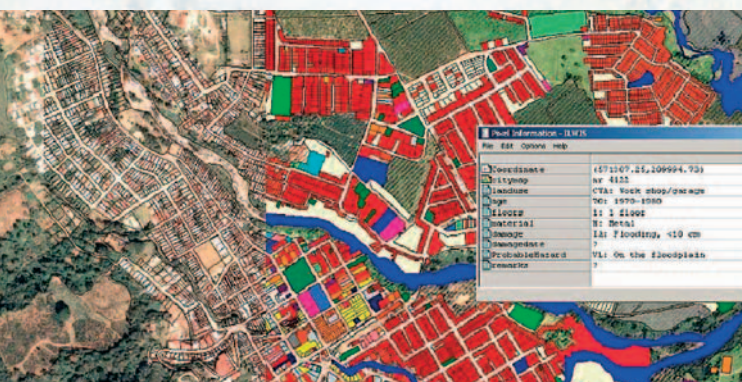
deals with Natural Hazard and Disaster Management, during which an overview is given of the use of RS and GIS within the various phases of disaster management, both pre- and post-disaster. Visits are planned to organisations in the Netherlands that use geo-information in the warning and monitoring of flood hazards, and in land-use planning

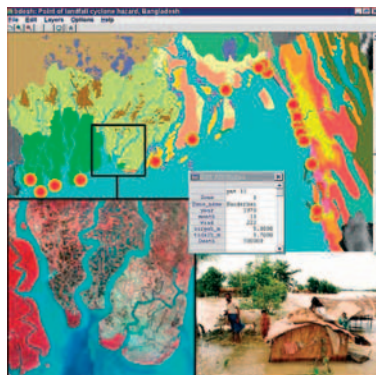
Module 4:

deals with risk assessment in an urban environment. During this module you will follow the whole procedure starting with hazard assessment, elements at risk mapping, vulnerability assessment, cost estimation, and leading to a multi-hazard risk assessment, using an extensive case study from a city in a developing country.

## Admission requirements

Applicants for this course should at least have a BSc in earth sciences, environmental sciences, civil engineering, urban or regional planning or other discipline related to natural hazards and risks. They should have a basic understanding of GIS. As the course is given in English, proficiency in the English language is a prerequisite.





### More information

If you or your organisation wishes to apply for this course, or if you require more information about the course content and structure, please contact

Dr. Cees van Westen

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Email: [westen@itc.nl](mailto:westen@itc.nl)

### For applications and information about registration

Short course coordinator

Education Affairs department

P.O. Box 6, 7500 AA Enschede, The Netherlands

Phone: +31 (0)53 4874 444

Fax: +31 (0)53 4874 238

Email: [education@itc.nl](mailto:education@itc.nl)

Applications by email, fax or surface mail are welcome.

An application form may be downloaded from:  
<http://www.itc.nl/education/register>

### Costs

Tuition fee for this course is € 2,250. The tuition fee includes the costs for study materials.

For accommodation and meals, costs are estimated at € 735 per month per student.

### Course period

The course will be run on a yearly basis. In the year 2004, the course is scheduled from 16 February until 14 May 2004.

Applications for the course in 2004 need to be received by ITC before the end of January 2004.

### Logistics

ITC can provide suitable housing for the course participants, within walking distance from the ITC building. ITC can also arrange for allowance payments, health insurance and international flights.

All participants will be provided with their own work desk including PC, email-address and Internet-connection.

### Assessment and certification

At the end of the course, students will receive a course certificate.



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