

Natural Geological Hazards and Risks 1st and 2nd year

Presentation



Natural geological hazards (earthquakes, landslides, volcanoes, deformation of the earth's crust) are a major issue in our societies. This is reflected in a growing demand for understanding, controlling and managing telluric risks, both in France and internationally. The NATURAL GEOLOGICAL HAZARDS AND RISKS program was created to meet this need and trains students in the assessment of natural hazards using quantitative methods and geophysical tools. Students are prepared to work either for research (academic, semi-public or private), or for engineering offices in charge of natural hazard assessment or geophysical reconnaissance of surface terrain, or for local authorities.

The training is organized over two years and includes courses shared with the other programs of the master. It combines theoretical and practical approaches, and provides a range of cross-disciplinary skills for the various natural hazards. The first-year courses allow students to master the use of geophysical, seismological, remote sensing and numerical modeling tools. In the second year, the focus is on the use of these tools for the quantification of seismic, landslide and volcanic hazards and risks. In the second year, a large number of training hours are given in the form of projects (a mix of lectures, case studies and applications, evaluation on reports and oral presentations).

Almost every year, the classes include foreign students. Thus, the teaching is done in English.

The program is also associated to a Thematic Program (PT Risk), which brings together UGA students working on risks in general (technological, natural, etc.). This opening is offered to students on selection from the first year, in order to deepen their knowledge of risk management. To know more on this PT Risk, follow this [link](#) or the [teasers](#).

Training in the field, in companies or in research laboratories, plays a key role in this program. The end-of-master's internship (lasting between 4 and 6 months) takes place either in an engineering office, or in academic research (~25% of students), or in local authorities, in France or abroad (~20% of students each year).

Registration and scholarships

Access conditions

- The 1st year is open to students who have obtained a national diploma equivalent to a bachelor degree (licence) in a field compatible with that of the master, or via a validation of their studies or experience
- Entry to the 2nd year may be selective. It is open to candidates who have completed the 1st year of a Master in the field, subject to a review of their application

Public continuing education : You are in charge of continuing education :

- if you resume your studies after 2 years of interruption of studies
- or if you followed training under the continuous training regime one of the previous 2 years
- or if you are an employee, job seeker, self-employed

If you do not have the diploma required to integrate the training, you can undertake a [validation of personal and professional achievements \(VAPP\)](#)

[skin.odf-uga:SKIN_ODF_CONTENT_PROGRAM_CANDIDATURE_LABEL](#)

You want to apply and sign up for a master ? Please be aware that the procedure differs depending on the diploma you want to take, the diploma you have already obtained and, for foreign students, your place of residence. Let us be your guide – simply follow this [link](#)

Prerequisites

This course is intended for students in geosciences with a strong interest in working in the natural risks sector. Students have solid training in physics, geosciences and/or civil engineering.

Target group

- Students in initial training who have obtained a bachelor degree (licence) in Earth, physical, or mechanical sciences
- Foreign students wishing to pursue their studies in the field of telluric risks in France
- Students in continuing education wishing to pursue advanced studies in the field of telluric risks

Further studies

This course prepares students either to continue in the private or semi-state sector (consultancies, EPIC, local authorities), or to go on to do a doctoral thesis. The skills acquired in this course will provide the student with the experience needed to successfully pursue either of these two directions.

Practicals informations :

- > Component : UFR PhITEM (physique, ingénierie, terre, environnement, mécanique)
- > level : Baccalaureate +5
- > Duration : 2 years
- > Course type : Initial and Continuing Education

> Location(s) : Grenoble - University campus

Contacts

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Program

See the updated program in the [French webpages](#):

Master 1st year

Semester 7

UE Signal processing	6 ECTS
UE Introductory Field Course - Professional project	3 ECTS
UE Programmation et environnements informatiques	3 ECTS
3 option(s) to choose from 3	
UE Geophysical observation of the Earth	6 ECTS
UE Tectonics and surface processes (2023-2024)	6 ECTS
UE Geomechanics	3 ECTS
UE Geophysical Prospecting	3 ECTS
UE Professional and Scientific Communication 1	3 ECTS

UE Gestion des risques : approches réglementaires et alternatives	6 ECTS
UE Waves Physics	3 ECTS
UE Physics and Chemistry of the Earth	6 ECTS

Semester 8

UE Introduction to Seismic Risk	6 ECTS
UE Volcanic dynamics and hazards	3 ECTS
UE Advanced volcanic dynamics and hazards	3 ECTS
UE Mouvements de terrain, avalanches, ouvrages de protection	6 ECTS
4 option(s) to choose from 6	
UE Exploration geophysics	6 ECTS
UE Remote sensing and GIS project	6 ECTS
UE Data sciences & Inverse problems	3 ECTS
UE Instrumentation for geophysics	3 ECTS

UE Introduction to Machine learning in Earth Sciences	3 ECTS
UE Scientific computing	3 ECTS
UE Induced seismicity	3 ECTS

Master 2nd year

Semester 9

UE Advanced gravitational risk	3 ECTS
UE Engineering seismology	6 ECTS
UE Project in engineering seismology [seismic vulnerability, site characterization, ground motion simulation]	3 ECTS
UE Project in gravitational risk [multi-method approach]	3 ECTS
3 option(s) to choose from 4	
UE Active Faults	6 ECTS
UE Risk management: regulatory and alternative approaches	6 ECTS
UE Near surface geophysics	6 ECTS
UE Quantitative seismology	6 ECTS
UE Signal processing	6 ECTS
UE Tectonics and surface processes (2023-2024)	6 ECTS
UE Advanced Machine Learning in Earth Sciences	3 ECTS
UE Computing and data analysis Project	3 ECTS
UE Numerical Modelling	3 ECTS

Semester 10

UE short Internship	6 ECTS
UE long Internship	24 ECTS