

## Master in Civil engineering

# Geomechanics, Civil Engineering and Risks (GCER)

## Presentation

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The international GCER programme, co-accredited with G-INP, is based on:

- the international M1, which is entirely common to the two specialisations Civil Engineering and Mechanics and leads to three international programmes, including GCER.
- at M2 level, three specialised courses worth 3 ECTS are common to the HCE programme and the ENSE3, one module worth 3 ECTS is common to the HCE, and one specialised course is shared with the STE specialisation. More than 80% of the courses in this programme at M2 level are part of the Earthquake Engineering programme of the Erasmus Mundus MEEES (Master in Earthquake Engineering and Engineering Seismology).

## Objectives

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The Geomechanics, Civil Engineering and Risks (GCER) Programme is an international course primarily intended for students wishing to focus on research (PhD thesis) in the field of geomechanics and civil engineering in France or abroad, with a view to pursuing a career as teacher-researcher in a University, researcher in a large public organisation (CNRS, etc.) or R&D engineer within a company.

## Registration and scholarships

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**For the first year:** holders of a general scientific degree with a specialisation in mechanics, or equivalent diploma.

**For the second year:** students who have completed the first year of a compatible programme or one of equivalent level.

For candidates whose country of residence is not included in the "Studies in France" portal (PEF) scheme, the calendar for the eCandidat application campaigns is available [here](#).

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 a formation under the regime formation continues one of the 2 preceding 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 \(VAPP\)](#).

## Practicals informations :

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- > **School** : UFR PhITEM (physique, ingénierie, terre, environnement, mécanique)
- > **Duration** : 2 years
- > **Course type** : Initial and Continuing Education
- > **Location(s)** :
- > **Contacts** :

**Programme director**

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### Programme administration

Registrar's Office for the Master in Civil Engineering  
phitem.master.gc@univ-grenoble-alpes.fr

Application  
phitem.candidature.etudiant@univ-grenoble-alpes.fr

## Program

### Master in Applied Mechanics 1st year

#### Semester 7

<b>UE Solid mechanics</b>	3 ECTS	24,5h
<b>UE Fluid mechanics</b>	3 ECTS	24h
<b>UE Research project 1</b>	6 ECTS	30h
<b>UE Experimental techniques and methods 1</b>	3 ECTS	24h
<b>UE Numerical methods in solid and fluid mechanics 1</b>	3 ECTS	24h
<b>UE Image and signal processing</b>	3 ECTS	24h
1 option (s) to choose from 2		
<b>UE English</b>	3 ECTS	
<b>UE French as a foreign language</b>	3 ECTS	
2 option (s) to choose from 10		
<b>UE Mechanics of material</b>	3 ECTS	20h
<b>UE Reinforced concrete</b>	3 ECTS	20h
<b>UE Physics of granular media</b>	3 ECTS	20h
<b>UE Multiphysical couplings (THCM)</b>	3 ECTS	20h
<b>UE Convection in industrial and geophysical flows</b>	3 ECTS	26h
<b>UE Instabilities and turbulence</b>	3 ECTS	28h
<b>UE Basic geomechanics</b>	3 ECTS	20h
<b>UE Wave in fluids</b>	3 ECTS	24h
<b>UE Environmental flows</b>	3 ECTS	30h
<b>UE Introduction of geophysical fluids dynamics</b>	3 ECTS	30h

#### Semester 8

<b>UE Research project 2</b>	12 ECTS	60h
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<b>UE Experimental techniques and methods 2</b>	3 ECTS	24h
<b>UE Numerical methods in solid and fluid mechanics 2</b>	3 ECTS	24h
1 option (s) to choose from 2		
<b>UE English</b>	3 ECTS	
<b>UE French as a foreign language</b>	3 ECTS	
3 option (s) to choose from 10		
<b>UE Basic geomechanics</b>	3 ECTS	20h
<b>UE Mechanics of material</b>	3 ECTS	20h
<b>UE Reinforced concrete</b>	3 ECTS	20h
<b>UE Physics of granular media</b>	3 ECTS	20h
<b>UE Multiphysical couplings (THCM)</b>	3 ECTS	20h
<b>UE Instabilities and turbulence</b>	3 ECTS	48h
<b>UE Wave in fluids</b>	3 ECTS	48h
<b>UE Environmental flows</b>	3 ECTS	57h
<b>UE Introduction of geophysical fluids dynamics</b>	3 ECTS	60h
<b>UE Convection in industrial and geophysical flows</b>	3 ECTS	52h

### Master 2nd year

#### Semester 9 - International program

<b>UE Selected topic in continuum mechanics</b>	6 ECTS	30h
<b>UE Numerical methods for nonlinear mechanics</b>	6 ECTS	30h
6 option (s) to choose from 15		
<b>UE Basic geomechanics</b>	3 ECTS	20h

<b>UE Basic engineering seismology</b>	3 ECTS	20h
<b>UE Mechanics of damage and rupture</b>	3 ECTS	20h
<b>UE Behavior of geotechnical structures</b>	3 ECTS	20h
<b>UE Durability and vulnerability of structures and associated risks</b>	3 ECTS	20h
<b>UE Advanced soil mechanics</b>	3 ECTS	20h
<b>UE Advanced rock mechanics</b>	3 ECTS	20h
<b>UE Advanced concrete mechanics</b>	3 ECTS	20h
<b>UE Strain localization in geomaterials</b>	3 ECTS	20h
<b>UE Mechanics of porous media</b>	3 ECTS	20h
<b>UE Advanced experimental geomechanics</b>	3 ECTS	20h
<b>UE Dynamics of structures</b>	3 ECTS	20h
<b>UE Geomechanics in reservoir and basin systems</b>	3 ECTS	20h
<b>UE Soil dynamics and nonlinear site response analysis</b>	3 ECTS	20h
<b>UE Foreign language</b>	3 ECTS	

### Semester 9 - Erasmus Mundus program

<b>UE Engineering seismology</b>	6 ECTS	48h
<b>UE Basic geomechanics</b>	3 ECTS	20h
<b>UE Numerical methods for nonlinear mechanics</b>	6 ECTS	30h
<b>UE Selected topic in continuum mechanics</b>	6 ECTS	30h
3 option (s) to choose from 8		
<b>UE Dynamics of structures</b>	3 ECTS	20h
<b>UE Advanced rock mechanics</b>	3 ECTS	20h
<b>UE Advanced soil mechanics</b>	3 ECTS	20h
<b>UE Behavior of geotechnical structures</b>	3 ECTS	20h
<b>UE Durability and vulnerability of structures and associated risks</b>	3 ECTS	20h
<b>UE Advanced concrete mechanics</b>	3 ECTS	20h
<b>UE Soil dynamics and nonlinear site response analysis</b>	3 ECTS	20h
<b>UE Introduction to signal processing</b>	3 ECTS	24h

### Semester 10 - International program

<b>UE Traineeship</b>	30 ECTS
<b>Semester 10 - Erasmus Mundus program</b>	
<b>UE Traineeship</b>	30 ECTS