

CIVIL-448

**Geophysics for engineers**

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Cursus	Sem.	Type
Génie civil	MA2, MA4	Opt.

Langue d'enseignement	français / anglais
Crédits	3
Session	Eté
Semestre	Printemps
Examen	Pendant le semestre
Charge	90h
Semaines	14
<b>Heures</b>	<b>3 hebdo</b>
Cours	2 hebdo
Exercices	1 hebdo
<b>Nombre de places</b>	

**Remarque**

Language: English/ French

**Résumé**

le cours présente les principales méthodes géophysiques utilisées par les ingénieurs pour l'exploration et la surveillance des sites.

**Contenu**

The course provides general introductions to the most important methods of geophysical exploration and survey. The methods represent a primary tool for investigation of subsurface and are applicable to wide range of problems (prospecting for natural resources, geological surveying, and engineering investigations). The course covers the physical principles, methodology and interpretational procedure and application of the geophysical methods.

- gravity methods
- magnetic methods
- radiometric surveys and remote sensing
- electric current methods
- resistivity methods
- electromagnetic methods
- seismic methods
- reflection methods
- Refraction methods
- Induced and natural seismicity (fault mechanics & risk and hazard related to seismicity)
- Geophysical borehole loggings
- application to a) investigating geohazards, b) engineering (elastic) properties, c) resources and energy) d) environmental assessment.

**Mots-clés**

Geophysical prospecting, geophysical survey, seismic, electric and potential methods.

**Compétences requises****Cours prérequis obligatoires**

- Géologie (CIVIL-103)
- Mécanique des sols et écoulements souterrains (CIVIL-203)
- Mécanique des roches et ouvrages souterrains (CIVIL-304)

**Concepts importants à maîtriser**

- Rock formation
- Stress and strain, pore pressure
- Theory of elasticity

Lerning outcomes:

Measure, map and image the physical properties of the Earth's crust. Prepare maps, cross sections and images of physical properties of the Earth for economic, engineering, safety and environmental reasons.

### Méthode d'enseignement

lectures, exercises, practical work.

### Travail attendu

Participation au cours, résolution des exercices

### Méthode d'évaluation

Laboratory project (written report of the project)= 50%, oral = 50%

### Encadrement

Office hours	Non
Assistants	Oui
Forum électronique	Non

### Ressources

#### Liens Moodle

- <https://go.epfl.ch/CIVIL-448>

### Préparation pour