

<b>TITOLO DEL CORSO</b>			
SEISMIC EXPLORATION METHODS			
<b>Settore Scientifico - Disciplinare: GEO/11</b>		<b>CFU: 6 (3 LF + 3 LAB)</b>	<b>Ore: 62</b>
<b>Ore di studio per attività:</b>	<b>Lezioni frontali:</b>	<b>Laboratorio:</b>	<b>Attività di campo:</b>
	2	1	0
<b>Tipologia di attività formativa:</b> caratterizzante			
<b>SYLLABUS</b>			
<b>Prerequisiti:</b> Mathematics, Geophysics and Applied Geophysics, basic knowledge of informatics, Geology			
<b>Lezioni frontali</b>			
numero di ore 4	<u>Argomento:</u> Seismic equipment & field techniques. 2D and 3D seismic arrays.		
numero di ore 4	<u>Argomento:</u> Seismic wavefield sampling; data bandwidth; spatial and temporal aliasing.		
numero di ore 6	<u>Argomento:</u> Review of the 1D and 2D Discrete Fourier Transform, coherence analysis; signal enhancement; 1D and 2D filters.		
numero di ore 4	<u>Argomento:</u> The Common Midpoint: data coverage, space and transformation; stacking charts.		
numero di ore 4	<u>Argomento:</u> Convolution & synthetic seismogram; well logs from petrophysics;		
numero di ore 6	<u>Argomento:</u> Spiking and predictive deconvolution; theory and practice.		
numero di ore 4	<u>Argomento:</u> Qualitative and quantitative seismic velocity analysis techniques. Velocity transformations.		
numero di ore 6	<u>Argomento:</u> Seismic migration: theory and practice: time vs. depth, pre-stack vs. post-stack.		
<b>Laboratorio</b>			
numero di ore 4	<u>Attività:</u> <b>MATLAB</b> coding on convolution; well logs; filtering, deconvolution and migration.		
numero di ore 16	<u>Attività:</u> open-source software ( <b>Seismic Unix</b> ) and commercial packages ( <b>Landmark's SeisSpace Pro® suite</b> ) on <b>CentOs Linux 7</b> will be used to produce a geologically interpretable seismic stack. This will be achieved through a comprehensive seismic data processing stream that will take the seismic data from the field to the final <b>migrated section</b> .		

## **Risultati di apprendimento attesi**

### **Knowledge and understanding:**

The students must understand the logistics and equipment used in exploration seismology and determine optimal seismic wavefield parameters. They must also possess an ability to perform basic seismic reflection processing and basic and advanced time series analysis.

### **Applying knowledge and understanding:**

The students must apply their understanding of the principles of the seismic exploration methods to be able to evaluate quality, and potential pitfalls of seismic reflection data before attempting seismic data interpretation. Moreover, they must demonstrate problem solving abilities facing geological or applied research problems within broader contexts related to their field of study

### **Making judgements:**

The students must have the ability to integrate the newly acquired knowledge of the seismic exploration methods with previously acquired knowledge on geosciences, in order to handle complex problems, and try to formulate judgments when dealing with typical incomplete or limited information.

### **Communication:**

The students must be able to communicate clearly and unambiguously key concepts of seismic exploration methods to specialist and non-specialist audiences. In discussing scientific literature, the basic principles of the methods and their application must be communicated with appropriate language.

### **Learning skills:**

The students must be able to continue studying the subject without supervision. During the course, students will acquire the basis for building their own processing tools to handle and solve geologic challenges using seismic exploration data.

## **Modalità di verifica dell'apprendimento**

### **Prove intercorso:**

Preparation of a Report in Power Point with the results of the processing of the seismic reflection line. Grades in 30/30.

### **Esame finale:**

Discussion of the Report. Oral exam on the arguments discussed during the course. Grades in 30/30.