TITOLO DELL'INSEGNAMENTO – Prof. A. Lima ***MAGMATIC AND HYDROTHERMAL FLUIDS IN EARTH'S CRUST***			
Settore Scientifico - Disciplinare: GEO/08	**CFU: 6** (3 LF + 3 LAB)		**Ore: 60**
Ore di studio per attività:	**Lezioni frontali:** 2	**Laboratorio:** 1	**Attività di campo:** 0

Tipologia di attività formativa: a scelta/required

SYLLABUS

Prerequisiti: Mathematics, Chemistry, Geochemistry, Petrography, Geology,

Lezioni frontali	
numero di ore 2	Argomento/topic: Fluid inclusions genesis. Phylosophy of fluid inclusion analysis Microthermometric measurements: theoretical and practical aspects.
numero di ore 2	Argomento/topic: Fluid inclusions compositions: disctructive and non distructive methods.
numero di ore 2	Argomento/topic: Melt inclusions. Interpretation and utilization of microthermometric measurements: compositional data of simple and complex systems (H_2O, CO_2, H_2O-NaCl, CO_2-H_2O, CO_2-CH_4-N_2) and determinations of T, P and density at crystallization time.
numero di ore 2	Argomento/topic: Elaboration of microthermometric data. Analytical determinations using electronic and ionic probes, Raman, FTIR and ICP-MS Laser ablation.
numero di ore 4	Argomento/topic: Fluid inclusions in the study of hydrothermal ore deposits. Case histories
numero di ore 2	Argomento/topic: Fluid inclusions in the study of metamorphic and magmatic environment.
numero di ore 10	Argomento/topic: Melt inclusions in the study of petrogenetic processes of sub-volcanic magmatic systems. Case histories Campi Flegrei; Vesuvius, Etna, Pontine Islands, Hawaii.
Laboratory activities	
numero di ore 10	Sampling and sample preparation.
numero di ore 6	Study and exercises on set of synthetic inclusions, with different compositions
numero di ore 8	Microscope recognition of the different types of melt inclusions.

numero di ore 12	Heating experiment on melt inclusions by Linkam 1500 stage

Risultati di apprendimento attesi

Conoscenza e capacità di comprensione/Knowledge and understanding:

The students must be able to apply their knowledge to investigate fluid and melt inclusions in minerals to study and analyses the fluids in lithospheric magmatic processes, which contribute to ore deposits formation, geothermal fields, and to the evolution of magmas in active volcanic systems. Students must demonstrate the knowledge of methodologies and to elaborate even complex discussions concerning the various topics studied, the acquisition and interpretation of collected data.

Conoscenza e capacità di comprensione applicate/Applying knowledge and understanding

Students must demonstrate they have acquired a training that allows them to transfer the acquired scientific methodologies in other contexts and to be able to plan and solve the problems related to fluids in the Earth crust. The training course is aimed to enhance the operational skills necessary to concretely apply the acquired knowledge and methodological tools

Autonomia di giudizio/Making judgements:

Students must have the ability to integrate knowledge and handle complexity, and formulate judgments with incomplete or limited information, but that include reflecting on social and ethical responsibilities linked to the application of their knowledge and judgments.

Abilità comunicative/Communication:

The students must be able to communicate their conclusions, and the knowledge and rationale underpinning these, to specialist and non-specialist audiences clearly and unambiguously.

Capacità di apprendimento/Learning skills:

The students must have the learning skills to allow them to continue to study in a manner that may be largely self-directed or autonomous.

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Modalità di verifica dell'apprendimento/ Learning assesment procedure

Final exam that consists of written and oral tests.
The written test consists of answering to 15 multiple choice questions.
The oral exam consists of a discussion on lecture topics.