

Annex 1 (CdS structure) and Annex 2 (Teaching/Activity course sheet) are integral parts of this Didactic Regulations. **ANNEX 1.2**

## **DEGREE PROGRAM DIDACTIC REGULATIONS VOLCANOLOGY**

### **CLASS LM-74**

**School: Polytechnic and Basic Sciences School**

**Department: DiSTAR- Earth Science Sciences, Environment and Resource Department**

**Regulations in force since the academic year 2024-25**

## **STUDY PLAN**

### **KEY**

#### **Type of Educational Activity (TAF):**

**B** = Characterising

**C** = Related or Supplementary

**D** = At the student's choice

**E** = Final examination and language knowledge

**F** = Further training activities

Year I									
Fr. Less. = Frontal lesson    1 CFU=18 hours f.a. =. Field activity            1 CFU=12 hours lab. = Laboratory activities   1 CFU=16 hours									
Title Course	SSD	Module	CRE DITS	Hours	Type Activities  (lectures, workshops, etc.)	Course Modalities  (in-person, by distance)	TAF	Disciplinary area	Mandatory / optional
Physical Volcanology	GEO 08	single	9	108	4 Fr. Less + 1 lab. +4 f.a.	In-person	B	A1	Mandatory
Magmatology	GEO 07	single	6	48	6 Fr. Less	In-person	B	A1	Mandatory
Geochemistry of volcanic fluids	GEO 08	single	9	96	5 Fr. Less + 2 lab.+2 f.a.	In-person	B	A1	Mandatory
Volcano seismology and geodesy	GEO 10	single	6	52	5 Fr. Less + 1 lab	In-person	B	A4	Mandatory
Volcanotectonics	GEO 03	single	6	64	4 Fr. Less + 2 f.a.	In-person	B	A2	Mandatory
Statistics and mathematics for geosciences	GEO 10	single	6	60	3 Fr. Less + 3 lab	In-person	C	A4	Mandatory
Geophysical exploration of volcanic systems	GEO 11	single	6	52	5 Fr. Less. + 1 lab	In-person	B	A4	Mandatory
Slope stability in volcanic areas	GEO 05	single	6	60	4 Fr. Less. + 1 lab + 1 f.a.	In-person	D	A3	Mandatory (two of your choices)
Volcanic landforms and landscapes	GEO 04	single	6	60	4 Lez. Fr. + 1 lab + 1 f.a.	In-person	D	A3	

GIS and remote sensing in volcanic areas	GEO 05	single	6	60	3 Fr. Less + 3 lab	In-person	D	A3	
Experimental petrology	GEO 07	single	6	48	6 Fr. Less.	In-person	D	A1	
Geoarchaeology in volcanic areas	GEO 04	single	6	64	4 Fr. Less + 2 f.a.	In-person	D	A3	
Field volcanology	GEO 08	single	6	80	2 Fr. Less. + 4 f.a.	In-person	D	A1	

Year II									
Fr. Less. = Frontal lesson    1 CFU=18 hours									
f.a. = Field activity            1 CFU=12 hours									
lab. = Laboratory activities   1 CFU=16 hours									
Title Course	SSD	Module	CR EDITS	Hours	Type Activities (lectures, workshops, etc.)	Course Modalities (in-person, by distance)	TAF	Disciplinary area	Mandatory/ optional
Frontiers in multiparametric volcano monitoring	GEO 10	single	6	68	2 Fr. Less + 3 lab.+1 f.a.	In-person	B	A4	Mandatory
Volcano hazard and risk assessment	GEO 10	single	6	56	4 Fr. Less. + 2 lab	In-person	B	A4	Mandatory
Physical modelling of volcano processes and dynamics	GEO 10	single	6	52	5 Fr. Less. + 1 lab	In-person	C	A4	Mandatory
Hydrogeology of volcanic areas	GEO 05	single	6	60	3 Fr. Less. + 3 lab	In-person	D	A3	Mandatory (one of your choices)
Advanced isotope geochemistry	GEO 08	single	6	60	3 Fr. Less. + 3 lab	In-person	D	A1	
Internship			6	150			F		Mandatory

Other training activities/Italian language*			6				F/E		Mandatory
Prova finale			24				E		Mandatory
<p>* For foreign students. The acquisition of the CFUs indicated in the Table under the label "Other Training Activities" will be decided by the CCD following an explicit request from the student, to be made within predetermined deadlines and accompanied by suitable certification. As for other training activities, in order to obtain their recognition in CFUs, it will be necessary to present a certification attesting to professional activity, issued by officially recognized public or private entities, as well as other entities, both public and private, engaged in fields relevant to the educational and professional objectives of the degree program.</p>									

#### List of List of propaedeuticities

No entry propaedeuticities

No exit propaedeuticities

## ANNEX 2.1

### DEGREE PROGRAM DIDACTIC REGULATIONS

### VOLCANOLOGY

### CLASS LM74

**School: Polytechnical and Basic Science School**

**Department: DiSTAR – Earth Science, Environment and Resources Department**

**Didactic Regulations in force since the academic year 2024-2025**

<b>Course:</b>  Physical Volcanology	<b>Teaching Language:</b>  English
<b>SSD (Subject Areas): GEO08</b>	<b>CREDITS: 9 (4 front. less. +1 lab.+4 f.a.)</b>

Course year: 1°	Type of Educational Activity: Characterizing	
Teaching Methods: in-person		
<b>Contents extracted from the SSD declaratory consistent with the training objectives of the course:</b>  Volcanology studies the eruptive activity and geology of volcanic areas both in relation to the origin and evolution of magmas, and in relation to the dynamics of ascent, eruption, transport and deposition of the products, using the methods of petrography, geochemistry, geology and geophysics. The expertise in the field, based on experimental and modelling approaches, as well as direct observation of the phenomena, are also essential in the understanding of geodynamic processes, in the quantification and mitigation of risks associated with volcanic activity, and in the retrieval and exploitation of geothermal energy. (all. B DM 30 Ottobre 2015 n. 855).		
<b>Objectives:</b>  The final goal of this course is to develop the students’ ability of realizing a geological study in volcanic areas. The students should be able to carry out field and laboratory-based observation and analysis of volcanic successions and/or volcanic landforms, use scientific reasoning to interpret the results and deduce the deposition mechanism and eruptive process.		
<b>Propaedeutcities: none</b>		
<b>Is a propaedeuticity for: no exam</b>		
<b>Types of examinations and other tests:</b>  Written exam with either an obligatory or optional oral part. The written exam consisting of multiple choice, short answer essay and problem-solving questions and report on field activity.		

<b>Course:</b>  <b>Magmatology</b>		<b>Teaching Language:</b>  <b>English</b>
<b>SSD (Subject Areas): GEO07</b>		<b>CREDITS: 6 (6 front. less.)</b>
<b>Course year: 1°</b>	<b>Type of Educational Activity: Characterizing</b>	

<b>Teaching Methods: in-person</b>
<b>Contents extracted from the SSD declaratory consistent with the training objectives of the course:</b>  Petrology studies structure, composition, origin and systematics of igneous, metamorphic and sedimentary rocks; petrogenetic and geodynamic significance of petrographic associations; thermodynamic interpretation and modelling of petrogenetic processes, including experimental studies, on the stability of mineral associations in rocks and magmas; petrochemical and petrophysical characterisation of rocks; petrogenetic-structural surveys and studies of igneous and metamorphic complexes (all. B DM 30 Ottobre 2015 n. 855).
<b>Objectives:</b>  The final goal of this course is to develop the students' ability of understanding the main physical and chemical factors influencing magma behaviour during explosive and effusive eruptions. The student will be able to use analytical and experimental data in order to interpret pre- and syn- eruptive volcanic processes, and use these to define reasonable scenarios of volcanic hazard.
<b>Propaedeuticities: none</b>  <b>Is a propaedeuticity for: no exam</b>
<b>Types of examinations and other tests:</b>  Oral exam

<b>Course:</b>  Geochemisrty of volcanic fluids	<b>Teaching Language:</b>  English
<b>SSD (Subject Areas): GEO08</b>	<b>CREDITS: CREDITS: 9 (5 front. less. +2 lab.+2 f.a.)</b>
<b>Course year: 1°</b>	<b>Type of Educational Activity: Characterizing</b>
<b>Teaching Methods: in-person</b>	
<b>Contents extracted from the SSD declaratory consistent with the training objectives of the course:</b>  Geochemistry studies the genesis, distribution and behaviour of elements and nuclides in nature and their applications in the Earth Sciences, using the methods of chemistry and physical chemistry. The application of geochemical	

approaches is crucial in planning the exploitation of strategic natural resources, including geothermal energy, in the control and quantification of soil, water and air pollution processes and in the mitigation of natural hazards. (all. B DM 30 Ottobre 2015 n. 855).
<b>Objectives:</b>  The goal of this course is to introduce the students to the methods of the fluid geochemistry. To develop the students' skills to plan and define the strategies to investigate volcanic areas. Students should be able to carry out fluid sampling and measurements in the field, they should also learn laboratory instruments and analysis techniques.
<b>Propaedeutics: none</b>  <b>Is a propaedeuticity for: no exam</b>
<b>Types of examinations and other tests:</b>  Oral exam

<b>Course:</b>  Volcano seismology and geodesy	<b>Teaching Language:</b>  English
<b>SSD (Subject Areas): GEO10</b>	<b>CREDITS: 6 (5 front. less.+1 lab)</b>
<b>Course year: 1°</b>	<b>Type of Educational Activity: Characterizing</b>
<b>Teaching Methods: in-person</b>	
<b>Contents extracted from the SSD declaratory consistent with the training objectives of the course:</b>  The fields of competence of the sector concern the structure of the Earth system and the rocks that make it up, in its deep and superficial parts, to define and interpret its dynamics, through the quantitative evaluation of the physical parameters that characterise it. The main objectives are: the quantitative modelling of the Earth, the study of the geodynamic processes that characterise its evolution, past and present, the study of geo-electromagnetic and gravitational fields, the assessment of natural hazards related to seismic and volcanic phenomena and their mitigation. Similarly, the relevant aspects of geodetic, topographic, remote sensing and thematic cartography are developed..... (all. B DM 30 Ottobre 2015 n. 855).	

<b>Objectives:</b>  This course will prepare students, including those with no seismology and geodesy background, to interpret seismic and geodetic signals from volcanoes. Students will be able to manage earthquake and geodetic source generation, measurements and the main instrumental topics (up-to date seismometers, up-to date geodetic instruments, arrays, borehole instruments... )
<b>Propaedeuticities: none</b>  <b>Is a propaedeuticity for: no exam</b>
<b>Types of examinations and other tests:</b>  Oral exam

<b>Course:</b>  <b>Volcanotectonics</b>	<b>Teaching Language:</b>  <b>English</b>
<b>SSD (Subject Areas): GEO03</b>	<b>CREDITS: 6 (4 front. less.+2 f.a.)</b>
<b>Course year: 1°</b>	<b>Type of Educational Activity: Characterizing</b>
<b>Teaching Methods: in-person</b>	
<b>Contents extracted from the SSD declaratory consistent with the training objectives of the course:</b>  The sector is concerned with the study of the processes of the internal dynamics of the Earth and planets, the changes induced in surface and deep geological units, with the determination of the boundary conditions of the relationships between stress fields and types of elastic and inelastic deformation; the survey and three-dimensional reconstruction of complex geological structures at various scales and their evolution also through the integration with data provided by other fields of the Earth Sciences (all. B DM 30 Ottobre 2015 n. 855).	
<b>Objectives:</b>  This course introduces the basic knowledge about mechanisms and deformation related to magma emplacement and transport, and about the deformation structures hosted in the volcanic rocks.	
<b>Propaedeuticities: none</b>	



<b>Is a propaedeuticity for: no exam</b>
<b>Types of examinations and other tests:</b>  Oral exam – report on field activity

<b>Course:</b>		<b>Teaching Language:</b>
<b>Geophysical exploration of volcanic systems</b>		<b>English</b>
<b>SSD (Subject Areas): GEO11</b>		<b>CREDITS: 6 (5 front. less. +1 lab.)</b>
<b>Course year: 1°</b>	<b>Type of Educational Activity: Characterizing</b>	
<b>Teaching Methods: in-person</b>		
<b>Contents extracted from the SSD declaratory consistent with the training objectives of the course:</b>  The sector deals with measurement and data acquisition methodologies for the determination of geological structures and physical characteristics of the subsurface, both on land and on the seabed, and therefore also with the development of measurement instruments and methodologies for modelling, data processing and interpretation. Subsurface geophysical prospecting applies to the study of the earth's crust, the determination of seismic, volcanic, geological and hydrogeological hazards (all. B DM 30 Ottobre 2015 n. 855).		
<b>Objectives:</b>  The course aims at yielding adequate knowledge of the geophysical methods of investigation of the volcanic systems, of the theory and experiments of geophysical prospecting, as well as of data processing and interpretation techniques. The student will be prepared to tackle advanced studies critically and independently on the subject, as well as to develop simple feasibility projects for the geophysical survey, clearly formulating the scope, the hypotheses, the techniques, describing the various phases of the data processing and verifying the consistency and reliability of the interpretative results.		
<b>Propaedeuticities: none</b>		
<b>Is a propaedeuticity for: no exam</b>		

<b>Types of examinations and other tests:</b>
Oral exam

<b>Course:</b>		<b>Teaching Language:</b>	
Statistics and mathematics for geosciences		English	
SSD (Subject Areas): GEO10		CREDITS: 6 (3 front. less.+3 lab.)	
Course year: 1°	Type of Educational Activity: Related or Supplementary		
Teaching Methods: in-person			
Contents extracted from the SSD declaratory consistent with the training objectives of the course:			
The fields of competence of the sector concern the structure of the Earth system and the rocks that make it up, in its deep and superficial parts, in order to define and interpret its dynamics, through the quantitative assessment of the physical parameters that characterise it. The main objectives are: ....., the assessment of natural hazards related to seismic and volcanic phenomena and their mitigation. The above-mentioned objectives are pursued through methodologies and techniques for the acquisition, analysis and interpretation of gravimetric, magnetic, seismic, thermal and geo-electromagnetic data, using and developing quantitative methodologies of a physical, mathematical, computer, statistical nature, with the specific slant and for the purposes of the Earth Sciences.... (all. B DM 30 Ottobre 2015 n. 855).			
Objectives:			
The final goal of this course is to equip the students with a solid background in statistics and mathematics, which is preparatory for courses in physical modeling, and hazard analysis.			
Propaedeuticities: none			
Is a propaedeuticity for: no exam			
Types of examinations and other tests:			
Oral exam – laboratory reports			

<b>Course:</b>  <b>Experimental petrology</b>		<b>Teaching Language:</b>  <b>English</b>	
<b>SSD (Subject Areas): GEO07</b>		<b>CREDITS: 6 (6 front. less.)</b>	
<b>Course year: 1°</b>	<b>Type of Educational Activity: at the student's choice</b>		
<b>Teaching Methods: in-person</b>			
<b>Contents extracted from the SSD declaratory consistent with the training objectives of the course:</b>  The sector deals with structure, composition, origin and systematics of igneous, metamorphic and sedimentary rocks; petrogenetic and geodynamic significance of petrographic associations; thermodynamic interpretation and modelling of petrogenetic processes, including experimental studies, on the stability of mineral associations in rocks and magmas; petrochemical and petrophysical characterisation of rocks; petrogenetic-structural surveys and studies of igneous and metamorphic complexes (all. B DM 30 Ottobre 2015 n. 855).			
<b>Objectives:</b>  The final goal of this course is to develop the student's ability into understanding the fundamental knowledges of experimental petrology aimed at interpreting natural phenomena related with the genesis and differentiation of magmas and with magma ascent to the surface during volcanic eruptions.			
<b>Propaedeutcities: none</b>  <b>Is a propaedeuticity for: no exam</b>			
<b>Types of examinations and other tests:</b>  Oral exam			

<b>Course:</b> <b>Slope stability in volcanic ares</b>		<b>Teaching Language:</b> <b>English</b>	
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SSD (Subject Areas): GEO05		CREDITS: 6 (4 front. less. + 1 lab + 1 f.a.)
Course year: 1°	Type of Educational Activity: at the student's choice	
Teaching Methods: in-person		
<b>Contents extracted from the SSD declaratory consistent with the training objectives of the course:</b>  The competences of this sector include: soil protection, with a focus on landslides, deep gravitative slope deformations, subsidence and geopedology; technical characterisation of loose and welded rocks, also in relation to slope stability; geological exploration of the subsurface and thematic cartography, aimed at urban and spatial planning. (all. B DM 30 Ottobre 2015 n. 855).		
<b>Objectives:</b>  The objective of the course is to provide knowledge about i) slope stability conditions and landslide processes, ii) methods for analyzing slope stability, iii) methods for predicting landslides runout, iv) methods for estimating landslide susceptibility and risk and remediation measures for unstable slopes of volcanic and peri-volcanic areas. Conversely from a traditional slope stability course, contents and case histories will be selected on the basis of their consistence with the geomorphologic environment of volcanic and peri-volcanic areas.		
<b>Propaedeuticities: none</b>  <b>Is a propaedeuticity for: no exam</b>		
<b>Types of examinations and other tests:</b>  Oral exam, which includes recognition/interpretation of a landslide through a photo.		

<b>Course:</b>  <b>Geoarchaeology in volcanic areas</b>	<b>Teaching Language:</b>  <b>English</b>	
<b>SSD (Subject Areas): GEO04</b>	<b>CREDITS: 6 (4 front. less.+ 2 f.a.)</b>	

<b>Course year: 1°</b>	<b>Type of Educational Activity: at the student's choice</b>
<b>Teaching Methods: in-person</b>	
<b>Contents extracted from the SSD declaratory consistent with the training objectives of the course:</b>  The sector deals with the study of the 'environmental system' through the analysis of the elements and physical processes connected with the exogenous dynamics of the geosphere; with the experimental and theoretical study of the forms of the earth's surface on the basis of analysis methods and techniques, such as photo-interpretation, remote sensing and geomorphological surveys and processing also with the use of models; the development of cartographic methods and techniques, also with the use of territorial information systems, for the representation of data and their processing with particular attention to exogenous processes, geomorphological assets and environmental problems (all. B DM 30 Ottobre 2015 n. 855).	
<b>Objectives:</b>  Reconstruction of ancient buried landscapes and their anthropogenic features by using a multidisciplinary approach including earth and environmental sciences as well as archaeological and historical sources.	
<b>Propaedeutcities: none</b>  <b>Is a propaedeuticity for: no exam</b>	
<b>Types of examinations and other tests:</b>  Oral exam	

<b>Course:</b>  <b>Volcanic landforms and landscapes</b>	<b>Teaching Language:</b>  <b>English</b>
<b>SSD (Subject Areas): GEO04</b>	<b>CREDITS: 6 (4 front. less + 1 lab. + 1 f.a.)</b>
<b>Course year: 1°</b>	<b>Type of Educational Activity: at the student's choice</b>

<b>Teaching Methods: in-person</b>
<b>Contents extracted from the SSD declaratory consistent with the training objectives of the course:</b>  The sector deals with the study of the 'environmental system' through the analysis of the elements and physical processes connected with the exogenous dynamics of the geosphere; with the experimental and theoretical study of the forms of the earth's surface on the basis of analysis methods and techniques, such as photo-interpretation, remote sensing and geomorphological surveys and processing also with the use of models; the development of cartographic methods and techniques, also with the use of territorial information systems, for the representation of data and their processing with particular attention to exogenous processes, geomorphological assets and environmental problems (all. B DM 30 Ottobre 2015 n. 855).
<b>Objectives:</b>  To recognise the main volcanic forms and characterize them by morphometric analysis; assessing hazard and erosion rates related to drainage systems
<b>Propaedeuticities: none</b>   <b>Is a propaedeuticity for: no exam</b>
<b>Types of examinations and other tests:</b>  Oral exam

<b>Course:</b>  <b>GIS and remote sensing in volcanic areas</b>	<b>Teaching Language:</b>  <b>English</b>
<b>SSD (Subject Areas): GEO05</b>	<b>CREDITS: 6 (3 front. less. + 3 lab.)</b>
<b>Course year: 1°</b>	<b>Type of Educational Activity: at the student's choice</b>
<b>Teaching Methods: in-person</b>	
<b>Contents extracted from the SSD declaratory consistent with the training objectives of the course:</b>  The competences of this sector include: .... hydrogeology, with reference to the research of aquifers in the various geological contexts, the study of underground water circulation, the assessment of the vulnerability of aquifers, their	

management and defence against pollution; and thematic mapping, aimed at urban and territorial planning, including environmental impact and hydrogeological risk assessment (all. B DM 30 Ottobre 2015 n. 855).
<b>Objectives:</b>  The use of Geographical Information Systems (GIS), along with the integrated use of remote sensing monitoring techniques, will make it possible to acquire a wider knowledge of ground surface deformations in volcanic and peri-volcanic areas, with special emphasis on slope movements/gravitational and erosional phenomena.
<b>Propaedeuticities: none</b>  <b>Is a propaedeuticity for: no exam</b>
<b>Types of examinations and other tests:</b>  Written/oral exam - laboratory reports

<b>Course:</b>  <b>Field Volcanology</b>	<b>Teaching Language:</b>  <b>English</b>
<b>SSD (Subject Areas): GEO08</b>	<b>CREDITS: 6 (2 front. less. + 4 f.a.)</b>
<b>Course year: 1°</b>	<b>Type of Educational Activity: at the student's choice</b>
<b>Teaching Methods: in-person</b>	
<b>Contents extracted from the SSD declaratory consistent with the training objectives of the course:</b>  Volcanology studies the eruptive activity and geology of volcanic areas both in relation to the origin and evolution of magmas, and in relation to the dynamics of ascent, eruption, transport and deposition of the products, using the methods of petrography, geochemistry, geology and geophysics. The expertise in the field, based on experimental and modelling approaches, as well as direct observation of the phenomena, are also essential in the understanding of geodynamic processes, in the quantification and mitigation of risks associated with volcanic activity, and in the retrieval and exploitation of geothermal energy. (all. B DM 30 Ottobre 2015 n. 855).	
<b>Objectives:</b>  Field studies in volcanology concentrating on physical aspects of volcanic processes. This course provides the student with comprehensive training that covers several aspects of volcanic geology. Our training focuses on	

developing the skills and knowledge that will enable the student to carry out his/her own volcanological fieldwork on active volcanic systems. By the end of this Course, students will have knowledge of the basic principles of volcanism. They will be able to explain the mechanism of various types of volcanic eruptions, interpret volcanic deposits and their stratigraphic successions.

**Propaedeuticities: none**

**Is a propaedeuticity for: no exam**

**Types of examinations and other tests:**

Written exam with either an obligatory or optional oral part. The written exam consisting of multiple choice, short answer essay and problem-solving questions and report on field activity.

<b>Course:</b>		<b>Teaching Language:</b>	
<b>Frontiers in multi-parametric volcano monitoring</b>		<b>English</b>	
<b>SSD (Subject Areas): GEO10</b>		<b>CREDITS: 6 (2 front. less.+1 f.a. + 3 lab.)</b>	
<b>Course year: 2°</b>		<b>Type of Educational Activity: Characterizing</b>	
<b>Teaching Methods: in-person</b>			
<b>Contents extracted from the SSD declaratory consistent with the training objectives of the course:</b>			
The fields of competence of the sector concern the structure of the Earth system and the rocks that make it up, in its deep and superficial parts, to define and interpret its dynamics, through the quantitative evaluation of the physical parameters that characterise it. The main objectives are: the quantitative modelling of the Earth, the study of the geodynamic processes that characterise its evolution, past and present, the study of geo-electromagnetic and gravitational fields, the assessment of natural hazards related to seismic and volcanic phenomena and their mitigation. (all. B DM 30 Ottobre 2015 n. 855).			
<b>Objectives:</b>			
Gain knowledge about how to design a volcano monitoring network and use monitoring data to detect changes in the volcano dynamic jointly from different physical parameters.			
<b>Propaedeuticities: none</b>			



<b>Is a propaedeuticity for: no exam</b>
<b>Types of examinations and other tests:</b>  Oral exam

<b>Course:</b>  <b>Volcano hazard and risk assessment</b>	<b>Teaching Language:</b>  English
<b>SSD (Subject Areas): GEO10</b>	<b>CREDITS: 6 (4 front. less.+ 2 lab.)</b>
<b>Course year: 2°</b>	<b>Type of Educational Activity: Characterizing</b>
<b>Teaching Methods: in-person</b>	
<b>Contents extracted from the SSD declaratory consistent with the training objectives of the course:</b>  The fields of competence of the sector concern the structure of the Earth system and the rocks that make it up, in its deep and superficial parts, to define and interpret its dynamics, through the quantitative evaluation of the physical parameters that characterise it. The main objectives are:....., the assessment of natural hazards related to seismic and volcanic phenomena and their mitigation. (all. B DM 30 Ottobre 2015 n. 855).	
<b>Objectives:</b>  The goal of this course is to introduce the students to the principles of fluid-dynamics and review the basic physics necessary for understanding the physical models adopted in volcanology. The students will acquire the ability to use existing software and develop new simple models of magma transport and emplacement.	
<b>Propaedeuticities: none</b>   <b>Is a propaedeuticity for: no exam</b>	
<b>Types of examinations and other tests:</b>  Written exam	

<b>Course:</b>  <b>Physical modelling of volcano processes and dynamics</b>		<b>Teaching Language:</b>  <b>English</b>	
<b>SSD (Subject Areas): GEO10</b>		<b>CREDITS: 6 (5 front. less.+1 lab.)</b>	
<b>Course year: 2°</b>	<b>Type of Educational Activity: Related or Supplementary</b>		
<b>Teaching Methods: in-person</b>			
<b>Contents extracted from the SSD declaratory consistent with the training objectives of the course:</b>  The fields of competence of the sector concern the structure of the Earth system and the rocks that make it up, in its deep and superficial parts, to define and interpret its dynamics, through the quantitative evaluation of the physical parameters that characterise it. The main objectives are: the quantitative modelling of the Earth, the study of the geodynamic processes that characterise its evolution, both past and present, the study of geo-electromagnetic and gravitational fields, the assessment of natural hazards related to seismic and volcanic phenomena and their mitigation. (all. B DM 30 Ottobre 2015 n. 855).			
<b>Objectives:</b>  The goal of this course is to introduce the students to the principles of fluid-dynamics and review the basic physics necessary for understanding the physical models adopted in volcanology. The students will acquire the ability to use existing software and develop new simple models of magma transport and emplacement.			
<b>Propaedeutcities: none</b>  <b>Is a propaedeuticity for: no exam</b>			
<b>Types of examinations and other tests:</b>  Written exam and colloquium			

<b>Course:</b>	<b>Teaching Language:</b>
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Advanced isotope geochemistry		English
SSD (Subject Areas): GEO08		CREDITS: 6 (3 front. less. + 3 lab.)
Course year: 2°	Type of Educational Activity: at the student's choice	
Teaching Methods: in-person		
<b>Contents extracted from the SSD declaratory consistent with the training objectives of the course:</b>  Geochemistry studies the genesis, distribution and behaviour of elements and nuclides in nature and their applications in the Earth Sciences, using the methods of chemistry and physical chemistry. Using the same methods, Volcanology studies eruptive dynamics and its relationship with processes of magmatic origin and evolution from both an experimental and modelling perspective... The application of geochemical and volcanological approaches is crucial in planning the exploitation of strategic natural resources, including geothermal energy, ... and in the mitigation of natural hazards. (all. B DM 30 Ottobre 2015 n. 855).		
<b>Objectives:</b>  The main goal of this course is to provide the students with a solid background in isotope geochemistry applied to volcanology and petrology, including a laboratory experience aimed at producing and interpreting isotope data.		
Propaedeuticities: none		
Is a propaedeuticity for: no exam		
<b>Types of examinations and other tests:</b>  Written exam with either an obligatory or optional oral part. The written exam consisting of multiple choice, short answer essay and problem-solving questions and report on field activity.		

<b>Course:</b>  <b>Hydrogeology of volcanic areas</b>	<b>Teaching Language:</b>  <b>English</b>	
<b>SSD (Subject Areas): GEO05</b>	<b>CREDITS: 6 (3 front. less. + 3 lab.)</b>	

<b>Course year: 2°</b>	<b>Type of Educational Activity: at the student's choice</b>
<b>Teaching Methods: in-person</b>	
<b>Contents extracted from the SSD declaratory consistent with the training objectives of the course:</b>  The competences of this sector include: .... hydrogeology, with reference to the research of aquifers in the various geological contexts, the study of underground water circulation, the assessment of the vulnerability of aquifers, their management and defence against pollution; and thematic mapping, aimed at urban and territorial planning, including environmental impact and hydrogeological risk assessment (all. B DM 30 Ottobre 2015 n. 855).	
<b>Objectives:</b>  The course will provide appropriately selected hydrogeological methods for the characterization, monitoring, management and surveillance of volcanic areas, as well as use of volcanic aquifers as low enthalpy geothermal and thermo-mineral resources.	
<b>Propaedeuticies: none</b>  <b>Is a propaedeuticity for: no exam</b>	
<b>Types of examinations and other tests:</b>  oral exam on course topics and discussion of a project report (PowerPoint presentation).	

## ANNEX 2.2

### DEGREE PROGRAM DIDACTIC REGULATIONS

#### VOLCANOLOGY

#### CLASS LM-74

**School: Polytechnic and Basic Science School**

**Department: DiSTAR - Earth Sciences, Environment and Resources Department**

**Didactic Regulations in force since the academic year 2024-2025**

<b>Training Activity:</b> Internship Other training activities/Italian language		<b>Training Activity Language:</b> English	
<b>Content of the activities consistent with the training objectives of the course:</b> 1. Internship 2. Other training activities/Italian language		<b>CFU:</b> 1. 6 CFU 2. 6 CFU	
<b>Course year:</b> 1. 2 <sup>nd</sup> year 2. 2 <sup>nd</sup> year		<b>Type of Training Activity:</b> 1. F 2. F/E	
<b>Teaching Methods:</b> In person			
<b>Objectives:</b> <ul style="list-style-type: none"> <li>The internship 1. is intended to take place at either the INGV-OV or other INGV offices specializing in volcanology and/or geophysics in volcanic regions, as well as at observatories outside Italy. Through this internship, students gain hands-on experience with fieldwork methodologies and directly engage in applying the methods and techniques learned during their course of study.</li> <li>For foreign students 2. it is intended a course via CLA in the first semester of the second year to gain the mandatory basic knowledge of Italian language.</li> <li>For Italian students, the acquisition of the CFUs indicated under the label 2. "Other Training Activities" will be decided by the CCD following an explicit request from the student, to be made within predetermined deadlines and accompanied by suitable certification. As for other training activities, in order to obtain their recognition in CFUs, it will be necessary to present a certification attesting to professional activity, issued by officially recognized public or private entities, as well as other entities, both public and private, engaged in fields relevant to the educational and professional objectives of the degree program.</li> </ul>			
<b>Propaedeutics: none</b>  <b>Is a propaedeuticity for: no exam</b>			
<b>Types of examinations and other tests:</b> at the completion of the internship, the student will prepare a final report and send it to the CCD			

2.