



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze della Terra e del Mare		
ACADEMIC YEAR	2022/2023		
MASTER'S DEGREE (MSC)	GEORISK AND GEORESOURCES		
SUBJECT	SEISMIC RISK AND MICROZONATION		
TYPE OF EDUCATIONAL ACTIVITY	C		
AMBIT	21015-Attività formative affini o integrative		
CODE	22462		
SCIENTIFIC SECTOR(S)	GEO/11		
HEAD PROFESSOR(S)	CAPIZZI PATRIZIA	Ricercatore a tempo determinato	Univ. di PALERMO
OTHER PROFESSOR(S)			
CREDITS	6		
INDIVIDUAL STUDY (Hrs)	86		
COURSE ACTIVITY (Hrs)	64		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	2		
TERM (SEMESTER)	2° semester		
ATTENDANCE	Not mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	CAPIZZI PATRIZIA Tuesday 12:00 13:00 stanza docente Thursday 12:00 13:00 stanza docente		

DOCENTE: Prof.ssa PATRIZIA CAPIZZI

PREREQUISITES	Knowledge and control of the main topics of Mathematics, Physics and Geology.
LEARNING OUTCOMES	<p>KNOWLEDGE AND UNDERSTANDING:</p> <ul style="list-style-type: none">- Basic theoretical, experimental and practical knowledge in seismology and geophysics;- Sufficient familiarity with the scientific method of investigation; <p>ABILITY TO APPLY KNOWLEDGE AND UNDERSTANDING:</p> <ul style="list-style-type: none">- The ability to use mathematical and experimental tools for the analysis of geophysical and seismological processes; <p>MAKING JUDGMENTS:</p> <p>Students will acquire skills suitable for the application of geophysical method applied to seismic hazard and seismic microzonation;</p> <p>COMMUNICATION SKILLS:</p> <p>Students will gain the ability to work in groups and to fit in the workplace.</p> <p>LEARNING SKILLS:</p> <p>The acquired knowledge and learning skills will be useful for dealing with planning higher level courses (Master's Degree, PhD). The training acquired will also allow to increase knowledge with self-updates.</p> <p>The expected learning outcomes are developed throughout the training course through lectures and practice.</p>
ASSESSMENT METHODS	<p>2.388 / 5.000</p> <p>Risultati della traduzione</p> <p>During the course, students will have to develop a work project, also carried out in groups, starting from the study of the seismic hazard of an area up to the calculation of the local seismic response. During the course, some moments of control will be provided, with the presentation by the groups of the work done. Two written tests will be carried out during the course.</p> <p>The student's assessment includes an oral test in which questions on course subjects are presented, with particular attention to the propagation of seismic waves, to the seismogram analysis, localization of seismic hypocenters and evaluation of local seismic response. The student will have to demonstrate familiarity with the method of scientific investigation, a theoretical, legislative and experimental knowledge about the seismic hazard, the seismic microzonation and the geophysical method applied to it, and skills to use the tools acquired in application.</p> <p>The exam score is assigned by a vote expressed in thirtieths. The active participation of students in the lessons, exercises and work done individually in the form of exercises and relationships assigned during the course can weigh up to 15/30 on the final evaluation.</p> <p>To pass the exam, and then get a score of not less than 18/30, the student must demonstrate a basic achievement of the goals. The objectives achieved are considered elementary when examining / demonstrates that they have acquired a basic knowledge of the topics described in the program, is able to operate with minimal links between them, shows that they have acquired a limited degree of autonomy; His language is enough to communicate with the examiners.</p> <p>To achieve a score of 30/30 and praise, the student must demonstrate that he has achieved the objectives well. The goals achieved are considered excellent when the student demonstrates full knowledge of the subjects of the program, how to apply the acquired knowledge also in different / new / advanced contexts as opposed to those of the teaching itself, talks with lexical competence also within the specific reference language and is capable of elaborating and expressing independent judgments based on acquired knowledge.</p>
EDUCATIONAL OBJECTIVES	<p>Objective of the course is to provide solid base knowledge of seismic hazard and seismic microzonation.</p> <p>The student should have acquired the following skills:</p> <ol style="list-style-type: none">1) use of the fundamental statistical tools for a regional-scale seismic analysis,2) know-how to read a seismic hazard map,3) evaluation of different site effects for local seismic response,4) knowledge of the main topics of seismic microzonation;5) knowledge of the main techniques applied to the local seismic response;6) knowledge of the main techniques applied to the seismic characterization of foundation soils;
TEACHING METHODS	Lectures
SUGGESTED BIBLIOGRAPHY	<p>Indirizzi e criteri generali per la microzonazione sismica. (ICMS 2008). Editore: Dipartimento della Protezione Civile.</p> <p>Approccio geotecnico sugli effetti della risposta sismica locale. Guida aggiornata agli eurocodici e NTC 2018 con esempi pratici sull'analisi in 1D e 2D. Editore: Dario Flaccovio Editore.</p> <p>Manuale pratico di risposta sismica locale. Dal sismogramma allo spettro di progetto con Rexel e Strata. Editore: EPC</p>

SYLLABUS

Hrs	Frontal teaching
4	Introduction: major earthquakes in Italy and the world, the history of seismology
2	Seismology for seismic microzonation studies.
8	Definition of seismic hazard, vulnerability and exposure to the earthquake. Studies of regional seismicity. Seismogenetic zonation in Italy and Sicily. Seismic danger. Peak ground acceleration. Seismic zones
6	Seismic microzonation and reference legislation. Site effects. Seismic characterization of soils according the NTC 2018. Definition of local seismic danger. Geophysical methods to evaluate local seismicity. Slope stability under seismic conditions. Vseq.
8	Objectives of seismic microzonation for territorial planning. Seismic microzonation of I and III levels. General aspects of the use of surface geophysics in seismic microzonation. Active methods in surface waves. Passive single-station methods. Passive methods on seismic antenna - Interpretative procedures and examples.
4	Response spectrum, local seismic response and basic seismic response. Stratigraphic amplification and topographic amplification. Design spectra and seismic action. Definition of earthquake input.
Hrs	Workshops
6	evaluation of the basic seismic hazard of a municipality and the Gutenberg-Richter law
6	HVSR, MASW and DH data analysis and inversion to reconstruct the input sismo-stratigraphic model
6	calculation of the input accelerogram according to the different limit states with REXEL software
6	Local seismic response with STRATA software for one-dimensional numerical modeling.
4	Study and calculation of the 2D local seismic response
4	Study of a level III seismic microzonation project