



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Ingegneria
ACADEMIC YEAR	2022/2023
MASTER'S DEGREE (MSC)	CIVIL ENGINEERING
SUBJECT	SLOPE STABILITY
TYPE OF EDUCATIONAL ACTIVITY	B
AMBIT	50353-Ingegneria civile
CODE	06633
SCIENTIFIC SECTOR(S)	ICAR/07
HEAD PROFESSOR(S)	ROSONE MARCO Ricercatore a tempo determinato Univ. di PALERMO
OTHER PROFESSOR(S)	
CREDITS	9
INDIVIDUAL STUDY (Hrs)	147
COURSE ACTIVITY (Hrs)	78
PROPAEDEUTICAL SUBJECTS	
MUTUALIZATION	SLOPE STABILITY - Corso: INGEGNERIA E TECNOLOGIE INNOVATIVE PER L'AMBIENTE SLOPE STABILITY - Corso: ENGINEERING AND INNOVATIVE TECHNOLOGIES FOR THE ENVIRONMENT
YEAR	2
TERM (SEMESTER)	2° semester
ATTENDANCE	Not mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	ROSONE MARCO Tuesday 10:00 14:00 Ufficio docente (Viale delle scienze Ed. 8, Piano Terra, area geotecnica - stanza S08PT279)

PREREQUISITES	In-depth knowledge of Geotechnics
LEARNING OUTCOMES	Knowledge and ability to understand At the end of the course, the student will acquire knowledge concerning the evaluation of slope failure mechanisms and the evolution of landslide displacements, the characterization of the geotechnical properties of the soils affected by the failure and the identification of the predisposing causes and triggering landslides, the analysis of landslides in drained conditions, in undrained conditions and in partially drained conditions. Ability to apply knowledge and understanding The student will be able to recognize and describe the phenomena of failure of the slopes, perform slope stability analysis using manual calculation procedures and automatic calculation codes, define the geometrical, physical and mechanical parameters that intervene in the stability analysis of slopes. Will be able to draw up a survey program for the geotechnical characterization of the soil and for the monitoring of interstitial pressures and displacements over time, will define the measures for the stabilization of landslide, or marginally stable slopes. Autonomy of judgment The student will be able to recognize the impact on the stability of the slopes built by man and those related to changes in environmental conditions, identifying the main factors that characterize the interaction between use of soils and slope stability. Communication skills The student will acquire the ability to synthesise the results of the stability analysis and to highlight the importance of the activities of government and territory control for the reduction of landslide risk. Learning skills The topics of the Course will be developed considering theoretical, experimental and numerical aspects, so as to develop the ability to analyze marginally stable slopes and landslides.
ASSESSMENT METHODS	For both attending and non-attending students, the assessment will take place with an oral exam in which the student will present project work or exercises carried out during the course. The test is aimed at assessing the student's ability to apply the fundamental aspects of the course. The vote is expressed in thirtieths. The criteria for evaluation are the following: Rating: Excellent. Rating: 30-30 cum laude. Outcome: excellent knowledge of the topics, excellent property of language and analytical skill. Rating: very good. Rating: 26-29. Outcome: good knowledge of the topics, full ownership of language and analytical ability. Rating: Good. Rating: 22-25. Outcome: Basic knowledge of the main topics, discreet property of language and limited analytical capacity. Rating: enough. Rating: 18-21. Outcome: minimum basic knowledge of the main topics and language. Rating: Not enough. Rating: <18. Outcome: does not have an acceptable knowledge of the contents of the course topics.
EDUCATIONAL OBJECTIVES	The aim of the course is to provide the skills to assess the stability of cuts and natural slopes by means of the study of the following topics: -limit equilibrium methods for stability analysis, rigorous and simplified methods, Fellenius's, Bishop's, Spencer's, GLE, Sarma's methods; Newmark's methods for seismic analysis. Location of critical slip surface; stability charts. -Definition of geometric, physical and shear strength parameters for slope stability analysis. Progressive failure and delayed failure. -Pore-water pressure regime in slopes, stability of water reservoir bank. -Kinematic and geotechnical classification of landslides. -Slope stabilization works: modification of slope geometry (neutral line), drainages (trenches, hole and tunnel), capillary barriers, retaining structures. -Slope monitoring: shallow and in depth displacement measurements; inclinometers; pore water pressure measurements; hydraulic and diaphragm piezometers; piezometer response rate. -Slope stability analysis according to current technical code.
TEACHING METHODS	Lectures, classroom and informatics room exercises, field visits.
SUGGESTED BIBLIOGRAPHY	Airò Farulla C. (2001). Analisi di stabilità dei pendii. Hevelius Editore. ISBN: 9788886977906 Bromhead E.N. (1986). The stability of slopes. Surrey Univ. Press, London. ISBN: 9780419255802 Copia (formato .pdf) delle presentazioni utilizzate per le lezioni.

SYLLABUS

Hrs	Frontal teaching
1	Introduction
10	Limit equilibrium methods
2	Location of the critical slip surface
6	Pore-water pressure regime in slopes
4	Progressive failure and delayed failure
3	Definition of shear strength parameters
5	Kinematic and geotechnical classification of landslides
5	Slope monitoring
6	Slope stabilization measures
Hrs	Practice
3	Seismic slope stability
6	Slope stability analysis by means of manual calculation procedures
15	Slope stability analysis by means of automatic calculation procedures
6	Design of slope stabilization works
6	Slope stability analysis according to current technical code