UNIVERSITÀ DI PAVIA

Anno Accademico 2022/2023

LANDSLIDE MODELING AND MITIGATION STRATEGIES

Anno immatricolazione	2021/2022
Anno offerta	2022/2023
Normativa	DM270
SSD	ICAR/07 (GEOTECNICA)
Dipartimento	DIPARTIMENTO DI SCIENZE DELLA TERRA E DELL'AMBIENTE
Corso di studio	GEOSCIENZE PER LO SVILUPPO SOSTENIBILE
Curriculum	EARTH AND PLANETARY MATERIALS AND DYNAMICS
Anno di corso	2°
Periodo didattico	Primo Semestre (03/10/2022 - 13/01/2023)
Crediti	6
Ore	51 ore di attività frontale
Lingua insegnamento	English
Tipo esame	SCRITTO E ORALE CONGIUNTI
Docente	GIOFFRE' DOMENICO (titolare) - 6 CFU
Prerequisiti	Basic knowledge of geotechnical engineering and hydraulics
Obiettivi formativi	Landslides are one of the most destructive natural disasters. They are responsible each year of a large number of casualties and economic losses worldwide. Landslide modeling is of foremost importance for the mitigation of landslide risk both at a local and regional scales. Scope of the course is to introduce students to the basic theories and methods of landslide modeling and risk mitigation. The first part of the course reviews basic concepts of slope movements and erosional processes considering the various geological, geomorphological, hydrogeological and geotechnical settings. Topics include the study of the different mechanisms of slope instabilities and the corresponding analytical and numerical methods to be used in static condition taking into account their complex time-dependent behavior in mathematical and physically-based models. Pre-failure, progressive failures, reactivation and catastrophic failure conditions will be thoroughly analyzed.

	The second part of the course focuses on selection and design of structural and geotechnical mitigation measures aimed at slope stabilization and landslide risk mitigation. Topics include an overview of ground improvement techniques, mechanical and hydraulic interventions, insertion of rigid inclusions, stabilization by modifying the geometry of the slope and by using of geosynthetics for natural and artificial slopes. The course will consist of lectures to illustrate the theory and practical sessions where the emphasis is on problem solving.
Programma e contenuti	Schedule of lectures: 1. Review of basic principles of soil mechanics 2. Numerical modeling of slope instability using Limit Equilibrium Method 3. Numerical modeling of slope instability using displacement-based methods 4. Review of ground improvement techniques 5. Mechanical modification: principles of soil densification 6. Hydraulic modification: filtration, drainage and seepage control (drains) 7. Modification by inclusions and confinement: geosynthetic application 8. Review of structural Landslide Mitigation Measures 9. Ground improvement techniques for slope stabilization
Metodi didattici	Lectures (hours/year in lecture theatre): 36 Practical classes (hours/year in lecture theatre): 15
Testi di riferimento	ROBERT D. HOLTZ & WILLIAM D. KOVACS & THOMAS C. (1981) An Introduction to Geotechnical Engineering. Prentice-Hall Ed. HAUSMANN M.R. (1990) Engineering principles of ground modification, McGraw-Hill Pub Co. MOSELEY M.P. & KIRSCH K. (2004) Ground Improvement, Taylor & Francis ed
Modalità verifica apprendimento	Assignments will be handed over and graded during the course. The final examination will consist of a written test. The final exam format is closed-book. An equation sheet will be provided, if needed. Grading 40% assignments, 60% final exam.
Altre informazioni	The course material is posted at the KYRO website
Obiettivi Agenda 2030 per lo sviluppo sostenibile	$lbl_legenda_sviluppo_sostenibile