

Introduction to Geotechnics (C002660)

Course size *(nominal values; actual values may depend on programme)*

Credits 3.0 **Study time 90 h**

Course offerings and teaching methods in academic year 2024-2025

A (semester 2)	English	Gent	lecture seminar
----------------	---------	------	--------------------

Lecturers in academic year 2024-2025

Peiffer, Herman	TW15	lecturer-in-charge
-----------------	------	--------------------

Offered in the following programmes in 2024-2025

	crdts	offering
Master of Science in Sustainable Land Management(main subject Land and Groundwater Management)	3	A
Master of Science in Sustainable Land Management(main subject Urban Land Engineering)	3	A
Master of Science in Geology	3	A
Exchange programme in Geology (master's level)	3	A

Teaching languages

English

Keywords

Soil Mechanics, Foundation Engineering, Geotechnics

Position of the course

This course gives an introduction to the basic principles of soil mechanics and foundation engineering. The student should be able to analyse basic problems and foundation concepts; define a soil investigation campaign and distinguish the possibilities and limitations of various techniques.

Contents

- Soil classification and physical characteristics: Grain size distribution and classification of soils; Relative density and plastic behaviour of soils
- In situ soil investigation: Borings, mechanical tests en geophysical investigation
- Stresses in the soil: Total stress, water pressure and effective stress
- Mechanical characteristics of the soil: Compressibility and consolidation; Shear resistance
- Foundations and related topics: Shallow foundations; Deep foundations; Excavations, taludstabiliteit
- Groundwater: Groundwaterflow and permeability; Groundwaterlowering
- soil improvement and reinforcement of existing foundations

Initial competences

Elasticity and strength of materials

Final competences

- 1 Acquired competences:
 - 1 Erosion, sedimentation, ...
 - 2 Soil classification
 - 3 Plasticity and compaction degree
 - 4 Ground waterpressures, piezometric height and hydraulic permeability
 - 5 execution methods for the lowering of groundwater
 - 6 Total stress, effective stress and waterstress
 - 7 Compressibility and consolidation
 - 8 Shear resistance

- 9 borings
- 10 soil investigation
- 11 geophysical investigation
- 12 shallow foundations
- 13 Pile foundations
- 14 Slope stability, horizontal soil pressures
- 15 soil improvement
- 2 Acquired insights:
 - 1 Formation of soil
 - 2 Differences in dimensions of soil particles and behavior.
 - 3 Influence of water content
 - 4 Laboratory test apparatus
 - 5 Influence of the groundwater flow on the groundwater pressures
 - 6 Effect of the groundwater lowering on the environment
 - 7 Influence of the waterstress on the effective stress
 - 8 Time dependency of settlements
 - 9 Dependency of the velocity of loading on the shear resistance
 - 10 Time dependent settlements
 - 11 In situ soil investigation vs laboratory testing
 - 12 The importance of more detailed soil investigation
 - 13 Different types of foundation
 - 14 Excavation of a building pit; stability of a retaining wall
 - 15 Practical insights in geotechnical design
- 3 Verworven vaardigheden:
 - 1 Gebruik van beschikbare middelen
 - 2 Meer voeling krijgen met de verschillende begrippen
 - 3 Eenvoudige dimensionering van een grondwaterverlaging
 - 4 Berekening van totaalspanningen, waterspanningen en korrelspanningen
 - 5 Zettingsberekening en consolidatiegedrag
 - 6 Vastleggen in situ proevenprogramma
 - 7 Interpretatie en afleiding van grondmechanische parameters
 - 8 Afwegen van voor- en nadelen van verschillende uitvoeringsmethodes
- 4 Verworven attitudes:
 - 1 Zelfstandig opzoeken van beschikbare info
 - 2 Durven interpreteren en rekenwaarden vastleggen

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Group work, Seminar, Lecture, Independent work

Study material

Type: Syllabus

Name: Syllabus'

Indicative price: € 15

Optional: no

References

-

Course content-related study coaching

Student coaching and assistance: the lecturer and his/her assistants are available during or in between lectures; there is assistance during the workshops.

Assessment moments

end-of-term assessment

Examination methods in case of periodic assessment during the first examination period

Oral assessment

Examination methods in case of periodic assessment during the second examination period

Oral assessment

Examination methods in case of permanent assessment

Possibilities of retake in case of permanent assessment

not applicable

Calculation of the examination mark

Oral exam: 100%