Geotechnical finite element analysis - BMEEOGMDT83

I. Subject Specification

1. Basic Data

1.1 Title

Geotechnical finite element analysis

1.2 Code

BMEEOGMDT83

1.3 Type

Module with associated contact hours

1.4 Contact hours

Type	Hours/week / (days)
Lecture	2

1.5 Evaluation

Exam

1.6 Credits

3

1.7 Coordinator

name	András Mahler
academic rank	Associate professor
email	mahler.andras@emk.bme.hu

1.8 Department

Department of Engineering Geology and Geotechnics

1.9 Website

https://epito.bme.hu/BMEEOGMDT83
https://fiek2.mywire.org/course/view.php?id=2529

1.10 Language of instruction

english

1.11 Curriculum requirements

Ph.D.

1.12 Prerequisites

1.13 Effective date

1 September 2022

2. Objectives and learning outcomes

2.1 Objectives

The scope of this course is to familiarise students with advanced finite element modelling techniques, with particular focus on unsaturated soil behaviour and soil dynamics.

2.2 Learning outcomes

Upon successful completion of this subject, the student:

A. Knowledge

1. knows about unsaturated soil characteristics (SWCC, matric suction, stress variables)
2. knows about modelling techniques used for time-history analyses

B. Skills

1. is able to prepare geotechnical finite element model for advanced geotechnical problems such as ones involving unsaturated soil behaviour or dynamic problems

C. Attitudes

1. ready to learn

D. Autonomy and Responsibility

1. is autonomous

2.3 Methods

Lectures on special modeling concepts, unsaturated soil behaviour, a modeling dynamic problems.

2.4 Course outline

All classes are held in one week, immediately after the school, over 3 days. The basic programme for this period (day by day)
1st day: Lectures on unsaturated soil mechanics covering the following topics physical background, stress

variables, seepage calculation, strength and deformation properties.
2nd day: Finite element modelling of unsaturated soil behaviour. Two related sample problem will be explained and analysed with active participation of the students.
3rd day: Finite element modelling of soil dynamical problems. Two related sample problem will be explained and analysed with active participation of the students.
The detailed daily schedule is announced on the week before
The above programme is tentative and subject to changes due to calendar variations and other reasons specific to the actual semester. Consult the effective detailed course schedule of the course on the subject website.

2.5 Study materials

a) Online materials:

1. Online lecture videos on unsaturated

b) Written materials:

1. Unsaturated Soil Mechanics in Engineering Practice (2012). D. G. Fredlund, H. Rahardjo, M. D. Fredlund, Print ISBN:9781118133590 Online ISBN:9781118280492 DOI:10.1002/9781118280492
2. Plaxis tutorial

2.6 Other information

2.7 Consultation

The instructors are available for consultation during their office hours, as advertised on the department website. Special appointments can be requested via e-mail: mahler.andras@emk.bme.hu

This Subject Datasheet is valid for:

Inactive courses

II. Subject requirements

Assessment and evaluation of the learning outcomes

3.1 General rules

Written test

3.2 Assessment methods

Evaluation form	Abbreviation	Assessed learning outcomes
Written test	T	A.1-A.2; B.1; C.1; D.1

The dates of deadlines of assignments/homework can be found in the detailed course schedule on the subject's website.

3.3 Evaluation system

Abbreviation	Score
T	100%
Sum	**100%**

3.4 Requirements and validity of signature

Succesful test

3.5 Grading system

Grade	Points (P)
excellent (5)	85<=P
good (4)	70<=P<85%
satisfactory (3)	60<=P<70%
passed (2)	50<=P<60%
failed (1)	P<50%

3.6 Retake and repeat

There is one retake.

3.7 Estimated workload

Activity	Hours/semester
Participation on the lectures	14×2=28
Preparation for the test	50
Sum	**78**

3.8 Effective date

1 September 2022

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