

## I. Subject Specification

### 1. Basic Data

#### 1.1 Title

Geotechnikai véges elemes analízis

#### 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	Mahler András
academic rank	Associate professor
email	<a href="mailto:mahler.andras@emk.bme.hu">mahler.andras@emk.bme.hu</a>

#### 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=2526>

#### 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

The material will be presented in lectures. Active cooperation is required when creating finite element models.

### 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](mailto:mahler.andras@emk.bme.hu)

This Subject Datasheet is valid for:

Nem induló tárgyak

**II. Subject requirements**

Assessment and evaluation of the learning outcomes

## 3.1 General rules

Written test

## 3.2 Assessment methods

<b>Teljesítményértékelés neve (típus)</b>	<b>Jele</b>	<b>Értékelt tanulási eredmények</b>
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

<b>Jele</b>	<b>Részarány</b>
T	100%
<b>Összesen</b>	<b>100%</b>

## 3.4 Requirements and validity of signature

Successful test

## 3.5 Grading system

<b>Érdemjegy</b>	<b>Pontszám (P)</b>
jeles (5)	$85 \leq P$
jó (4)	$70 \leq P < 85\%$
közepes (3)	$60 \leq P < 70\%$
elégséges (2)	$50 \leq P < 60\%$
elégtelen (1)	$P < 50\%$

## 3.6 Retake and repeat

There is one retake.

## 3.7 Estimated workload

<b>Tevékenység</b>	<b>Óra/félév</b>
Participation on the lectures	$14 \times 2 = 28$
Preparation for the test	50
<b>Összesen</b>	<b>78</b>

## 3.8 Effective date

1 September 2022

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