

## Tárgytematika / Course Description

### Tunnels

EKNM\_SETA016

**Tárgyfelelős neve /**

**Teacher's name:** dr. Ray Richard Paul

**Félév / Semester:** 2021/22/2

**Beszámolási forma /**

**Assesment:** Vizsga

**Tárgy heti óraszám /**

**Teaching hours(week):** 3/0/0

**Tárgy féléves óraszám /**

**Teaching hours(sem.):** 0/0/0

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### OKTATÁS CÉLJA / AIM OF THE COURSE

Based on previous geotechnical knowledge, this course is introducing the different tunnel construction methods, the principles of tunnel design and the failures, maintenance and renovation of underground structures. The topic focuses on the design process of underground structures. The students will be able to determine the main input data for tunnel design, will know the tunnel excavation method, and can choose an adequate tunneling method to solve a specific problem. We are also introducing the principles of waterproofing and tunnel maintenance. After a successful exam the students will be able to actively participate in tunnel design and excavation processes and after some year of experience they will be able to manage tunnel design and tunnel excavation

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### TANTÁRGY TARTALMA / DESCRIPTION

The topics of the lectures:

- geotechnical design of tunnels
- tunnel construction
- ground improvement
- tunnel excavation methods
- pipe jacking
- temporary lining
- groundwater, waterproofing
- monitoring: risk analysis, risk management
- inner lining: maintenance

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### SZÁMONKÉRÉSI ÉS ÉRTÉKELÉSI RENDSZERE / ASSESMENT'S METHOD

A home assignment need to be prepared by the students in group of 3-4 person. The home work is to make a conceptual design for a railway tunnel in Budapest, between two of the mthree main station in Budapest (Kelet, Nyugati, Déli). The homework constits of the four main task:

- 1) choose of three possible alignments
- 2) comparison and analysis of the three selected proposals for the tunnel alignment
- 3) excavation planing, ground improvement and temporary support

4) water proffing, drainage, permanent lineng

The conceptual design need to documented in a study in 40-50 pages and presented at the end of the semester.

In the exam period there are exams weekly, in which the students need to solve a test with 40-50 questions.

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### **KÖTELEZŐ IRODALOM / OBLIGATORY MATERIAL**

- Széchy Károly - The Art of Tunnelling
- Hoek, Brown - Underground Excavations in Rock
- Hoek's corner - [https://www.rocsience.com/education/hoeks\\_corner](https://www.rocsience.com/education/hoeks_corner)
- Bruland - Hard Rock Tunnel Boring
- Maidl, Thewes - Handbook of Tunnel Engineering, pt. I & II
- Grundbau-Taschenbuch, 7.Auflage, Teil 1 Geotechnische Grundlagen
- Betonkalender 2014, including Eurocode 7