# Tárgytematika / Course Description
## Bridge construction

**NGM_SE107_1**

**Tárgyfelelős neve / Teacher's name:** dr. Harrach Dániel
**Félév / Semester:** 2023/24/2
**Beszámolási forma / Assesment:** Vizsga
**Tárgy heti óraszáma / Teaching hours(week):** 2/1/0
**Tárgy féléves óraszáma / Teaching hours(sem.):** 0/0/0

## OKTATÁS CÉLJA / AIM OF THE COURSE

On the basis of the knowledge gained in the civil engineering basic courses students are introduced to bridge engineering, first by its historical and aesthetical aspects. Later, the fundamentals of bridge engineering are taught showing the way of leading linear structures over obstacles. It is discussed how their rules and conditions determine the forming and the structures of the bridge and its structural parts.

The main types of superstructures and bridges are presented, considering their structural system, construction method and expected lifetime. The basics of the analyses and the maintenance of bridges are also dealt with.

The aim of this course is to introduce students to the design and construction of bridges and to provide such a general knowledge that is complete on a basic level and can help professionals interested in other fields, while it can also be a base for others intending to study bridge engineering in a more specific way.

On successfully completing this course, students should be able to

- recognize and interpret the structural system of bridges, and understand the structural behavior of the different bridge types;
- appreciate the different types of bearings, joints, piers and abutments;
- identify special construction methods;
- determine the actions to be considered for the design of bridges according to Eurocodes.

## TANTÁRGY TARTALMA / DESCRIPTION

- **History of Bridges, Terminology #1**
- **Terminology #2, Aesthetics of Bridges**
- **Steel bridges #1: Steel Beams, Plated Web Girders, Splices of Steel Bridges**
- **Steel bridges #2: Steel Boxes, Truss Girders, Arch Bridges**
- **Reinforced Concrete & Prestressed Conncrete Bridges**

- **Cross-sections of Bridges by Materials, Spans of Bridge Types**
- **Substructures of Bridges, Bridge Equipments, Dewatering of Bridges**
- **Loads & Actions on Bridges, Eurocode, Calculation of Bridges, Applicable Software Tools**
- **Construction Methods of Bridges**
- **Design Documentation of Bridges**

## SZÁMONKÉRÉSI ÉS ÉRTÉKELÉSI RENDSZERE / ASSESMENT'S METHOD

**Small Exam Papers (SE)**

The parts of the lectures not covered by the semester assignment will be questioned in the form of short mid-term papers (held before each lecture).

**Assignment I.: Preparing a presentation on a given bridge type (AI)**

Each of the formed work groups (see Work Groups for Presentations) is given a bridge type. The task is to find material on the Internet and/or from other sources and make a 12-15 minute long presentation on that topic (preferably 3-4 minutes per person).

The presentation might not be too technical as you are still learning about bridge construction. However, make sure to address the bridge parts (and possibly the actions governing their design), materials used, and if you can, the construction methods used to build the specific bridges you are discussing.

**Assignment II: Presentation about an extraordinary bridge (AII)**

**This is an individual assignment! Everyone has to choose one bridge of any kind, which in your opinion is extraordinary (do not present on a bridge that has already been discussed, either in the lectures or during the group presentations). The task is to find material on the internet and/or from other sources and make a 5-minute long presentation (no more than 10 slides!) on that bridge.**

Examination (EX)

During the examination period, there will be a written test based on the lectures and the compulsory literature.

Scoring (the minimums are in brackets)

SE: 25 (10)  AI: 25 (10)  AII: 25 (10)  EX: 25 (20)

Grading

After the exam the grading is done according to the scores having been gained:
0 – 39 : 1 (fail)
40 – 53: 2 (pass)
54 – 66: 3 (satisfactory)
67 – 79: 4 (good)
80 – 100: 5 (excellent)

## KÖTELEZŐ IRODALOM / OBLIGATORY MATERIAL

- G. Parke, N. Hewson: ICE manual of bridge engineering

- W-F. Chen, L. Duan: Bridge Engineering Handbook / Construction and Maintenance / Chapter 19: Bridge Construction Methods

- ESDEP course – Structural systems: Bridges

- D. J. Brown: Bridges - Three Thousand Years of Defying Nature

## AJÁNLOTT IRODALOM / RECOMMENDED MATERIAL