

Tárgytematika / Course Description Bridge Structures 1

EKNB_SETA009

Tárgyfelelős neve /

Teacher's name: dr. Harrach Dániel

Félév / Semester: 2023/24/2

Beszámolási forma /

Assesment: Vizsga

Tárgy heti óraszám /

Teaching hours(week): 2/1/0

Tárgy féléves óraszám /

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

OKTATÁS CÉLJA / AIM OF THE COURSE

The students are introduced to the bridge engineering, first by its historical and aesthetic 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 shaping 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 life cycle together with the maintenance of bridges are also dealt with.

The aim of this module is to introduce students to the construction of bridges and to give such a general knowledge, which is complete on its basic level and can help professionals going on to other fields while can also be a base for other ones intending to study more bridge engineering a more specific way.

On successfully completing this course unit, students should be able to

- recognize and interpret the structural system of bridges, understand the structural behaviour of the different bridge types;
- make difference among the types of bearings, joints, piers and abutments;
- identify the special construction methods.

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 Concrete 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**
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SZÁMONKÉRÉSI ÉS ÉRTÉKELÉSI RENDSZERE / ASSESSMENT'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.: making presentation about selected technical terms of bridges (AI)

Everyone has to choose 8 technical terms from the lecture presentations and put them on 8 slides one by one. Then each slide has to be completed by the explanation of the related term and by photos and/or figures of it by own drawing and/or from the Internet. Finally - after submission - it has to be presented orally (3-4 minutes long) in the class of the presentation day.

Assignment II.: making presentation of an extraordinary bridge (AII)

Everyone has to choose one bridge of any kind which is extraordinary according to the chooser. The task is to find materials on Internet and/or from other sources and make a 4 minute long presentation of that bridge. The presentation must not be very professional but the following aspects has to be taken into consideration:

- detect what sort of that bridge: structural system of the bridge, and the main girder, and find if it is deck/through/semi-through, (possible) type of abutment and piers;
- show (orally enough) the flow of forces in the structure;
- describe the bridge in details (materials, dimension, connections etc. what you can find);
- share some interesting thing about its history if there is;

- try to find how it was built;
- advantages/disadvantages of the bridge if there are any.

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