

**Tárgytematika / Course Description****Construction Materials 2.****EKNB\_EETA020****Tárgyfelelős neve /****Teacher's name:** dr. Bozsaky Dávid**Félév / Semester:** 2021/22/1**Beszámolási forma /****Assesment:** Vizsga**Tárgy heti óraszám /****Teaching hours(week):** 2/0/1**Tárgy féléves óraszám /****Teaching hours(sem.):** 0/0/0**OKTATÁS CÉLJA / AIM OF THE COURSE**

The subject introduces students to the basic knowledge about materials used in building construction industry. It presents the physical, chemical and mechanical properties of building materials and deals with qualification methods. It introduces students to the Hungarian and European technical standardization systems. It intends to make future designers to choose and apply the technically and economically optimal material from the available variety of building materials.

**TANTÁRGY TARTALMA / DESCRIPTION***Lectures*

- 1) General information about the subject. Basics of mathematical statistics and mechanics used in material testing and product certification.
- 2) Special material properties of fresh and hardened concrete. Methodology of concrete mixture design.
- 3) Characterization, classification and basic properties of building metals. Special properties of building metals, crystallization of metals. Metal corrosion and corrosion protection.
- 4) Iron and steel production. The physical and mechanical properties of iron and steel. General properties of alloys. Properties of iron-carbon alloys.
- 5) Iron and steel heat treatment, steel forming technologies. Types of steel and steel products. The concept of steel brittle and fatigue.
- 6) The concept of building wood, the structure of wood. variety of wood and timber products.
- 7) Special materials properties of building wood. Wood joints, wood defects wood diseases and wood protection.
- 8) Types, properties, application and standard tests of glass.
- 9) Types, properties, application and standard tests of plastics.
- 10) Basics of thermodynamics, building physics.
- 11) Types, material properties and application fields of thermal insulation materials. Calculation of the heat transfer coefficient.
- 12) Summary, mid term test
- 13) Repeated mid term test or pre-exam.

14) Reserved lecture or Invited guest lecturer (optional).

### *Labs*

- 1) Standard qualification tests of fresh concrete (consistency tests, air content test)
- 2) Standard tests of hardened concrete (compressive strength, Schmidt hammer, ultrasonic pulse velocity test)
- 3) Standard qualification tests of steel products. Determination of tensile strength, yield stress and nominal yield stress.
- 4) Hardness tests and brittle fracture test of steel.
- 5) Mechanical tests of wood products.
- 6) Thermodynamic tests (thermal conductivity, heat transfer coefficient) and thermography.

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## **SZÁMONKÉRÉSI ÉS ÉRTÉKELÉSI RENDSZERE / ASSESSMENT'S METHOD**

### *Evaluation*

Students have 1 mid term test during the semester which five-grade evaluation. Lab reports have two-grade evaluation.

Grades and points:

excellent (5)	44,00-50,00	(88,00-100,00%)
good (4)	37,50-43,99	(75,00-87,99%)
satisfactory (3)	31,50-37,49	(63,00-74,99%)
passed (2)	25,00-31,49	(50,00-62,99%)
failed (1)	0,00-24,99	(0,00-49,99%)

### *Deadlines and remediation options*

There is one mid term test. Depending on the timetable of the current semester, the date of the mid term test is the 12th week of the semester. Repeated mid term test is 2 weeks later (14th week of the semester). Laboratory reports can be submitted continuously during the semester, but their final submission deadline is the last day of the semester at 12:00.

Students who successfully completed the mid term test at first time (12th week) can take a pre-exam in the last week of the semester. The student can receive offered grade based on the result of the pre-exam and the grade of the mid term test.

### *Terms of recognition*

Participation in the lab session (more than one unauthorized absence is not allowed), successful, completion of the mid term test (minimum passed grade), submission of laboratory protocols by deadline.

### *Recognition of the semester*

A successful exam is required for recognition of the semester.

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## **KÖTELEZŐ IRODALOM / OBLIGATORY MATERIAL**

### **Obligatory reading**

D. Bozsaky: Construction materials 1. [slides and presentation], 2020

S. K. Duggal: Building Materials, New Age International, New Delhi (India), ISBN 978-81-224-2975-6, 2008, 544 p.

A. Deplazes: Constructing Architecture: Materials, Processes, Structures, Birkhäuser, Basel (Switzerland) ISBN 978-3-7643-7313-9, 2005, 479 p.

### **Recommended reading**

S. S. Bhavikatti: Basic Civil Engineering, New Age International, New Delhi (India), ISBN 978-81-224-2853-7, 2010, 300 p.

F. S. Merritt, J. T. Ricketts: Building Design and Construction Handbook, McGRAWHILL, New York (USA), ISBN 978-00-70419-9-95, 2000