

Tárgytematika / Course Description

Engineering Structures 1

EKNB_SETA012

Tárgyfelelős neve /

Teacher's name: dr. Papp Ferenc

Félév / Semester: 2022/23/1

Beszámolási forma /

Assesment: Vizsga

Tárgy heti óraszám /

Teaching hours(week): 2/2/0

Tárgy féléves óraszám /

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

OKTATÁS CÉLJA / AIM OF THE COURSE

The purpose of the course is to present the statical behaviour of material-specific (steel, reinforced concrete and wood) structures and the basics of material-specific design methods. By fulfilling the course the student will understand the material-specific mechanical behaviour of simple structures and the basics of design methods. Additionally, the student will be able to design and check simple structures and structural elements independently. The course is a part of a course-group with the courses of Design and Analysis of Structures, Building Materials 2 and Building Structures 1.

TANTÁRGY TARTALMA / DESCRIPTION

Week 1.	Lecture: Classification, construction and behaviour of structural elements - part 1: steel structural elements, tensioned steel bar	Tutorial: design of a tensioned bar
Week 2.	Lecture: Classification, construction and behaviour of structural elements - part 2: reinforced concrete elements, tensioned RFC element	Tutorial: design of a tensioned RFC element
Week 3.	Lecture: Classification, construction and behaviour of structural elements - part 3: The mechanical properties of the wooden structures, the influencer factors of these properties	Tutorial: examples for simple forces
	Homework 1: Design of a tensioned structural element by alternative methods	

- Lecture: Bent-sheared structural elements - part 1: bent steel structural elements
- Week 4.
- Tutorial: design of a bent steel beam
- Lecture: Bent-sheared structural elements - part 2: bent reinforced concrete elements, I., II. and III. State of stress
- Week 5.
- Tutorial: design of a bent-sheared reinforced concrete beam
- Lecture: Bent-sheared structural elements - part 3: examination of bent-sheared wooden structures (strength, stability, deformation)
- Week 6.
- Tutorial: examples for checking of bent-sheared wooden elements
- Homework 2: design of a bent-sheared wooden element by alternative methods
- Lecture: Compressed structural elements - part 1: compressed steel bars
- Week 7.
- Tutorial: design of a compressed steel bar
- Lecture: Compressed structural elements - part 2: compressed reinforced concrete elements
- Week 8.
- Tutorial: design of a compressed reinforced concrete column
- Lecture: Compressed structural elements - part 3: construction, loading and checking of single and complex-profiled wood columns (compressed elements)
- Week 9.
- Tutorial: examples for checking compressed wood elements
- Homework 3: design of a compressed structural element by alternative methods
- Lecture: Construction and behaviour of screwed steel joints
- Week 10.
- Tutorial: design of screwed joints

Lecture: Construction and behaviour of welded steel joints

Week 11. Tutorial: design of welded joints

Homework 4: design of steel structural joints

Week 12. Lecture: Construction of the armature of reinforced concrete structural elements, reinforcement spacing, anchorage, joints and details

Tutorial: reinforcement plan of a beam

Lecture: Examination of serviceability limit states of reinforced concrete structures, deformation, crack width

Week 13. Tutorial: reinforcement plan of a beam

Homework 5: preparation of a reinforcement plan of a beam

Week 14. Lecture and Tutorial in one block: summary and preparation for the exam

SZÁMONKÉRÉSI ÉS ÉRTÉKELÉSI RENDSZERE / ASSESSMENT'S METHOD

Preparation of a design work in 5 subtasks. For each task 20 points can be obtained, for the whole work maximum 100 points. Minimum 10 points are needed for the subscription for each task. The exam consist of a theoretical and a practical part. Minimum 51 points are needed for the successful exam. The calculation of the final note:

0-110 points: failure

110-129 points: below average

130-149 points: average

150-169 points: above average

170-200 points: excellent

KÖTELEZŐ IRODALOM / OBLIGATORY MATERIAL

(1) www.consteelsoftware.com; www.axisvm.com

(2) Luís Simoes da Silva, Rui Simoes, Helena Gervásio: Design of Steel Structures, Ernst & Sohn Verlag, 2010. ISBN: 9783433030912

(3) Prab Bhatt, T.J. MacGinley, Ban Seng Choo: Reinforced Concrete Design to Eurocodes: Design Theory and Examples, CRC Press, 2014. ISBN: 978-1466552524

(4) Jack Porteous, Abdy Kermani: Structural Timber Design to Eurocode 5, Wiley-Blackwell, 2013. ISBN: 978-1-118-59729-3