Tárgytematika / Course Description
Engineering Structures 1

EKNB_SETA012

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

Week 4.	Lecture: Bent-sheared structural elements - part 1: bent steel structural elements Tutorial: design of a bent steel beam
Week 5.	Lecture: Bent-sheared structural elements - part 2: bent reinforced concrete elements, I., II. and III. State of stress Tutorial: design of a bent-sheared renforced concrete beam
Week 6.	Lecture: Bent-sheared structural elements - part 3: examination of bent-sheared wooden structures (strength, stability, deformation) Tutorial: examples for checking of bent-sheared wooden elements Homework 2: design of a bent-sheared wooden element by alternative methods
Week 7.	Lecture: Compressed structural elements - part 1: compressed steel bars Tutorial: design of a compressed steel bar
Week 8.	Lecture: Compressed structural elements - part 2: compressed reinforced concrete elements Tutorial: design of a compressed reinforced concrete column
Week 9.	Lecture: Compressed structural elements - part 3: construction, loading and checking of single and complex-profiled wood columns (compressed elements) Tutorial: examples for cheking compressed wood elements Homework 3: design of a compressed structural element by alternative methods
Week 10.	Lecture: Construction and behaviour of screwed steel joints 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 structrual 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 / ASSESMENT'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 for the subscription for each task. The exam consist of a theroetical and a practical part. Minimum 51 points are needed for the successfull 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

AJÁNLOTT IRODALOM / RECOMMENDED MATERIAL