

I. Tantárgyleírás

1. Alapadatok

1.1 Tantárgy neve

Steel and Composite Structures

1.2 Azonosító (tantárgykód)

BMEEOHSAS47

1.3 Tantárgy jellege

Kontaktórás tanegység

1.4 Óraszámok

Típus	Óraszám / (nap)
Előadás (elmélet)	3

1.5 Tanulmányi teljesítményértékelés (minőségi értékelés) típusa

Félévközi érdemjegy

1.6 Kreditszám

4

1.7 Tárgyfelelős

név	Dr. Kovács Nauzika
beosztás	Egyetemi docens
email	kovacs.nauzika@emk.bme.hu

1.8 Tantárgyat gondozó oktatási szervezeti egység

Hidak és Szerkezetek Tanszék

1.9 A tantárgy weblapja

<https://epito.bme.hu/BMEEOHSAS47>

<https://edu.epito.bme.hu/course/view.php?id=2611>

1.10 Az oktatás nyelve

magyar és angol

1.11 Tantárgy típusa

Kötelező az építőmérnöki (BSc) szakon

1.12 Előkövetelmények

Strong prerequisites:

- Steel Structures (BMEEOHSAT42)
- Reinforced Concrete Structures (BMEEOHSAT43)

1.13 Tantárgyleírás érvényessége

2020. február 5.

2. Célkitűzések és tanulási eredmények

2.1 Célkitűzések

The aim of the Subject is to teach the structural speciality, layout and design of plated girders, including the followings: effect of internal forces and moments interaction on the cross-sectional resistance and stability phenomenon; the configuration and design of simple connections.

The further aim is to teach the configuration, behaviour and the basis of the elastic and plastic design methods of composite girders.

2.2 Tanulási eredmények

A tantárgy sikeres teljesítése után a hallgató

A. Tudás

1. knows the general terminology of the steel and composite structures,
2. knows the design methods of welded plate girders,
3. knows the cross-sectional and stability phenomenon interaction of steel structures,
4. knows the configuration of simple steel structural joints,
5. knows the configuration of composite girders,
6. knows the elastic design method of composite girders,
7. knows the plastic design method of composite girders,
8. knows the elastic and plastic design methods of shear connections.

B. Képesség

1. able to design of steel plate girders,
2. able to design of steel columns under eccentric compression,
3. able to design the simple joints of steel structures,
4. able to determine the elastic and plastic resistance of composite beam cross-section,
5. able to do design the shear connections by elastic and plastic methods.

C. Attitűd

1. opened to gain new knowledge, increase their knowledge by continuous learning,
2. opened to used IT devices,
3. pursue to accurate and error-free solutions

D. Önértékelés és felelősség

1. design the steel and composite beams individually based on given source materials,
2. apply systematic thinking

2.3 Oktatási módszertan

The theoretical background of the design of the steel and composite structures are explained on the lectures and numerical examples are solved on the exercise classes. Homework examples should be solved individually by the Student and check the correct results online with the aim to be prepared for the mid-term exams.

2.4 Részletes tárgyprogram

Week	Topics of lectures and/or exercise classes
1.	Local plate buckling: class 4 sections, shear buckling.
2.	Welded plate girders: configuration, design concepts.
3.	Beam-columns: cross-section classification, cross-sectional resistances.
4.	Beam-columns: stability behaviour and design.
5.	Simple connection: beam splices and column bases.
6.	Simple connection: pinned column base connection.
7.	Simple connection: beam-to-beam connections.
8.	Concept of composite construction, structural layout and behaviour.
9.	Design of composite structures: basis.
10.	Composite beams: elastic calculation for short and long term loadings.
11.	Composite beams: cross-section classification.
12.	Composite beams: cross-sectional resistances
13.	Configuration of shear connectors and design by elastic and plastic method.
14.	Steel and composite structures: examples.

A félév közbeni munkaszüneti napok miatt a program csak tájékoztató jellegű, a pontos időpontokat a tárgy honlapján elérhető "Részletes féléves ütemterv" tartalmazza.

2.5 Tanulástámogató anyagok

Online materials

1. ESDEP Course WG.10. Composite structures
2. Slides of Lectures.
3. Solved examples.
4. Sample for midterm exams

2.6 Egyéb tudnivalók

Attendance to lectures and exercise classes is compulsory. The signature and credits of the subject will be refused to students attending less than 70% of the classes.

2.7 Konzultációs lehetőségek

The instructors are available for consultation during their office hours, as advertised on the department website. Special appointments can be requested via e-mail:

kovacs.nauzika@emk.bme.hu or seres.noemi@emk.bme.hu

Jelen TAD az alábbi félévre érvényes:

II. Tárgykövetelmények**3. A tanulmányi teljesítmény ellenőrzése és értékelése****3.1 Általános szabályok**

The assessment of the learning outcomes specified in clause 2.2. above and the evaluation of student performance occurs via midterm tests and homework assignments.

3.2 Teljesítményértékelési módszerek

Evaluation form	Abbreviation	Assessed learning outcomes
1. midterm test	MT1	A.1-A.2; B.1
2. midterm test	MT2	A.3-A.4; B.2-B.3
3. midterm test	MT3	A.5-A.8; B.4-B.5
1-3. homework	HW1	A.1-A.4; B.1-B.5; C.1-C.3; D.1-D.2
attendance and activity (optional; positive only)	A	A.1-A.8; B.1-B.5

A szorgalmi időszakban tartott értékelések pontos idejét, a házi feladatok ki- és beadási határidejét a "Részletes féléves ütemterv" tartalmazza, mely elérhető a tárgy honlapján.

3.3 Teljesítményértékelések részaránya a minősítésben

Abbreviation	Score
MT1	34%
MT2	34%
MT3	17%
HW1	3%
HW2	5,5%
HW3	6,5%
A (bonus)	17%
Sum	100%

Midterm exams:

- All midterm exams have theoretical and practical parts.
- Two midterm exams should be completed $\geq 50\%$ among the three midterms, theoretical and practical part separately.
- The best two theoretical and practical parts are not necessarily from the same midterms (e.g. MT1 and 3 theories and MT2 and 3 practices are the two bests).

Home works:

- Home works are optional.
- The aim of the home works are the preparation for the practical part of the midterms. They are parametric practical examples, unique for each student.
- Max. 15 points are gained by Home works.

Bonus points:

- By completing the third midterm (less gained points) successfully ($\geq 50\%$) bonus points are gathered.
- The theoretical and practical parts of the third midterm (less gained points) max 7 and 10 points are gathered.

3.4 Az aláírás megszerzésének feltétele, az aláírás érvényessége

Signature is not gained in this Subject.

3.5 Érdemjegy megállapítása

Student fulfilled the attendance requirements, and completed the two midterm exams with results $\geq 50\%$, the semester grade is calculated by as follows:

Achievable max. points:	Abbreviation	Max points
	Mt best:	34 point (theory:14 point + practice: 20 point)
	Mt second best:	34 point (theory:14 point + practice: 20 point)
	Home works:	15 point
	Bonus:	17 points
	Sum:	100 point
The grade of the semester based on the gained points:		
	Grade	Points (P)
	excellent (5)	$85 \leq P$
	good (4)	$75 \leq P < 85$
	satisfactory (3)	$65 \leq P < 75$
	passed (2)	$50 \leq P < 65$
	failed (1)	$P < 50$

3.6 Javítás és pótlás

1. No repetition or retake of the Midterm exams are available.
2. No repetition or retake of the Home works are available.

3.7 A tantárgy elvégzéséhez szükséges tanulmányi munka

Activity	Hours/semester
contact hours	$14 \times 3 = 42$
preparation for the courses	$7 \times 2 = 14$
preparation for the midterm tests	$2 \times 14 = 28$
homework	18
home studying of the written material	18
Sum	120

3.8 A tárgykövetelmények érvényessége

2023. szeptember 4.

Jelen TAD az alábbi félévre érvényes: