

# SUBJECT DATASHEET

---

## I. SUBJECT SPECIFICATION

### 1 BASIC DATA

#### 1.1 Title

STEEL AND COMPOSITE STRUCTURES

#### 1.2 Code

BMEEOHSAS41

#### 1.3 Type

Module with associated contact hours.

#### 1.4 Contact hours

type	hours/week
lectures	2
seminars/exercise classes	1
laboratory practices	0

#### 1.5 Evaluation

midterm grade

#### 1.6 Credits

4

#### 1.7 Coordinator

name: Dr. Kovács Nauzika  
academic rank: associate professor  
email: [kovacs.nauzika@epito.bme.hu](mailto:kovacs.nauzika@epito.bme.hu)

#### 1.8 Department

Department of Structural Engineering (<http://epito.bme.hu/hidak-es-szerkezetek-tanszek>)

#### 1.9 Website

[www.epito.bme.hu/BMEEOHSS41](http://www.epito.bme.hu/BMEEOHSS41)

#### 1.10 Language of instruction

Hungarian and English

#### 1.11 Curriculum requirements

Compulsory in the Structural engineering (BSc) programme

#### 1.12 Prerequisites

Required previous subjects (need to be completed to register)  
Steel structures (BMEEOHSAT42)  
Reinforced concrete structures (BMEEOHSAT43)

#### 1.13 Effective date

September 1, 2017.

## 2 OBJECTIVES AND LEARNING OUTCOMES

### 2.1 Objectives

---

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 Learning outcomes

---

Upon successful completion of this subject, the student:

#### A. Knowledge

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. Skills

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. Attitudes

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. Autonomy and responsibility

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

### 2.3 Methods

---

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 Course outline

---

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, construction methods.

9. Design of composite structures: basis.
10. Composite beams: elastic calculation for short and long term loadings.
11. Composite beams: cross-section classification, cross-sectional resistances.
12. Composite beams: stability behaviour and design.
13. Configuration of shear connectors and design by elastic and plastic method.
14. Steel and composite structures: examples.

The above programme is tentative and subject to changes due to calendar variations and other reasons specific to the actual semester. Consult the effective detailed course schedule of the course on the subject website.

### 2.5 *Study materials*

---

- a) Textbooks
- b) Printed lecture notes
- c) Online materials
  1. ESDEP Course WG.10. Composite structures
  2. Slides of Lectures.
  3. Solved examples.
  4. Sample for midterm exams

### 2.6 *Other information*

---

- 1) 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 *Consultation*

---

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@epito.bme.hu](mailto:kovacs.nauzika@epito.bme.hu)

## II. SUBJECT REQUIREMENTS

### 3 ASSESSEMENT AND EVALUATION OF THE LEARNING OUTCOMES

#### 3.1 General rules

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 Assessment methods

Evaluation form	abbrev.	assessed learning outcomes
1. midterm test	MT1	A.1-A.4; B.1-B.3
2. midterm test	MT2	A.5-A.8; B.4-B.5
1. homework	HW1	A.1-A.4; B.1-B.3; C.1-C.3; D.1-D.2
2. homework	HW2	A.5-A.8; B.4-B.5, C.1-C.3; D.1-D.2

The dates of midterm tests and deadlines of homework can be found in the detailed course schedule on the subject's website.

#### 3.3 Evaluation system

abbreviation	score
MT1	44%
MT2	44%
HW1	6%
HW2	6%
<b>Total achievable during the semester</b>	<b>100%</b>
<b>Sum</b>	<b>100%</b>

The midterm test is valid if at least 1/3 of the points are obtained from each parts (theory and calculations), to pass the midterm test the sum of the obtained points has to reach 50% of the total points.

#### 3.4 Requirements and validity of signature

Signature is not gained in this Subject.

#### 3.5 Grading system

Students fulfilled the attendance requirement may have grade based on the table bellow:

grade	points (P)
excellent (5)	85% $\leq$ P
good (4)	73% $\leq$ P < 85%
satisfactory (3)	62% $\leq$ P < 73%
passed (2)	50% $\leq$ P < 62%
failed (1)	P < 50%

#### 3.6 Retake and repeat

- 1) Retake and re-assignment of the corrected homework is not possible.
- 2) The retake or the repeat of any midterm tests (MT) overwrite the original results.
- 3) In case the Student cannot have valid midterm test using the retakes during the semester, they may retake one of the midterm test in the repetition period with paying the extra charge.
- 4) All the valid midterm test results have to gain in one semester.

### 3.7 *Estimated workload*

---

<b>activity</b>	<b>hours/se- mester</b>
contact hours	14×3=42
preparation for the courses	7×2=14
preparation for the midterm tests	2×14=28
homework	18
home studying of the written material	18
<b>in total</b>	<b>120</b>

### 3.8 *Effective date*

---

September 1, 2017.