SUBJECT DATASHEET

I. SUBJECT SPECIFICATION

1 BASIC DATA

1.1 Title

STEEL STRUCTURES

1.2 Code

BMEEOHSAT42

1.3 Type

Module with associated contact hours

1.4 Contact hours

type	hours/week
lectures	3

1.5 Evaluation

midterm grade

1.6 Credits

3

1.7 Coordinator

name: Dr. Balázs Kövesdi

academic rank: associate professor

email: kovesdi.balazs@epito.bme.hu

1.8 Department

Department of Structural Engineering (www.hsz.bme.hu)

1.9 Website

www.epito.bme.hu/BMEEOHSAT42

1.10 Language of instruction

Hungarian and English

1.11 Curriculum requirements

Compulsory in the Civil Engineering (BSc) programme

1.12 Prerequisites

Required previous subjects (need to be completed to register)

Introduction to Strengthening of Materials (BMEEOTMAT42)

Bases of Structural Design (BMEEOHSAT41)

Subjects from which previous midterm signature are required to register

Construction Materials I. (BMEEOEMAT43)

1.13 Effective date

September 1, 2017.

2 OBJECTIVES AND LEARNING OUTCOMES

2.1 Objectives

Lectures of Steel Structures have the general aim to study the basics of the design of steel structures, which consists of the design of simple structural members, simple joints and the investigation of the basic failure phenomenon, which can occur in steel structures. The students get knowledge in the following topics: steel grades, mechanical properties of the steel material; calculation of cross sectional properties; design of centrically loaded tension members; design of centrically loaded compression members; buckling problem – behaviour – design method; design of beams: construction, behaviour under bending and shear interaction; beam structural behaviour - design approaches for lateral torsional buckling; design of bolted connections; design of welded connections; fatigue design and brittle fracture; plate buckling phenomena, basics of the cross section classification.

2.2 Learning outcomes

Upon successful completion of this subject, the student:

A. Knowledge
   1. knows the limit states used for design of steel structures,
   2. knows the design method of centrically loaded tension members,
   3. knows the design method of centrically loaded compression members,
   4. knows the design method of restrained beam members loaded by bending and shear,
   5. knows the design method used for lateral torsional buckling,
   6. knows the design basics of bolted joints,
   7. knows the design basics of welded joints,
   8. knows the buckling phenomena and the basics of the cross-section classification.

B. Skills
   1. can design a centrically loaded tension member,
   2. can calculate the buckling resistance of centrically loaded compression member,
   3. can perform the cross-section check of beam elements,
   4. can calculate the lateral torsional buckling resistance of beams,
   5. can calculate the resistance of bolted joints,
   6. can calculate the resistance of welded joints,

C. Attitudes
   1. is ready to learn advanced new design methods,
   2. is intent on learning and applying the relevant tools of steel structural design,
   3. is intent on precise and error-free problem solving,

D. Autonomy and responsibility
   1. is able to autonomously evaluate the design problems of steel structures and able to autonomously complete design calculations based on the literature,

2.3 Methods

Lectures, large hall calculation examples, communication in written and oral form, application of IT devices and techniques.

2.4 Course outline

week:	Topics of lectures and/or exercise classes
1.	Introduction. Steel, as a structural material; mechanical properties; notations; steel production
2.	Centrically loaded tension members. Structural layout – behaviour – design method
3.	Centrically loaded compression members. Buckling problem: Structural layout –

behaviour – design method.

4. Centrically loaded compression members. Buckling length determination – .
5. Beams: construction, behaviour under bending and shear and M-V interaction. Behaviour - design approaches.
6. Beams: Lateral torsional buckling. Behaviour – design approaches, general and simplified design methods
7. Design philosophy of beam members – examples.
8. Design and layout of steel joints; construction aspects of welded and bolted joints and their application fields
9. Design of welded connections: structural layouts, structural behaviour, limit states, design approaches.
10. Design of welded connections / design approaches / examples.
11. Design of bolted connections: structural layouts, structural behaviour, limit states, design approaches.
12. Design of bolted connections / design approaches / examples.
13 Plate buckling phenomena, design methods,.
14. Basics of the cross section classification; conceptional design of steel structures / case studies.

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
   1. Halász, Platthy: Acélszerkezetek.

b) Online materials
   1. Lecture notes
   2. Examples for practical design of steel structures

2.6 Other information

--

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: kovesdi.balazs@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 attendance on the lectures.

3.2 Assessment methods

Evaluation form	abbrev.	**assessed learning outcomes**
1. midterm test	ZH1	A.1-A.4; B.1-B.3; C.1-C.3; D.1;
2. midterm test	ZH2	A.5-A.8; B.4-B6; C.1-C.3; D.1;

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

3.3 Evaluation system

abbreviation	**score**
ZH1	50%
ZH2	50%
Sum	**100%**

Criterion for the successful performance is to collect at least 50% of the total points of the midterm tests.

3.4 Requirements and validity of signature

No signature can be achieved.

3.5 Grading system

If the student satisfies the attendance criteria, his/her mark will be determined as follows:
The final mark is calculated on the basis of the weighted average of the midterm tests (with the weights shown in the table of Section 3.3), as shown in the following table:

grade	**points (P)**
excellent (5)	85<=P
good (4)	75<=P<85%
satisfactory (3)	65<=P<75%
passed (2)	50<=P<65%
failed (1)	P<50%

3.6 Retake and repeat

1) The midterm test can be repeated – once without fee – at a previously determined date given in the course schedule.
2) In case of repetition of the test, the better result will be taken into account for the calculation of the final grade.
3) If the first repetition is also unsatisfactory (failed), then the test can be repeated once more on the repetition week by paying a fee.
4)

3.7 Estimated workload

activity	**hours/semester**
contact hours	14×3=42
preparation for the tests	2x16=32
home studying of the written material	16
in total	**90**

3.8 Effective date

September 1, 2017.