I. Subject Specification

1. Basic Data

1.1 Title

STEEL BUILDINGS

1.2 Code

BMEEOHSA-A1

1.3 Type

Module with associated contact hours

1.4 Contact hours

Type	Hours/week / (days)
Lecture	3
Seminar	1

1.5 Evaluation

Exam

1.6 Credits

5

1.7 Coordinator

name	Dr. László Gergely Vigh
academic rank	Associate professor
email	vigh.laszlo.gergely@emk.bme.hu

1.8 Department

Department of Structural Engineering

1.9 Website

https://epito.bme.hu/BMEEOHSA-A1
https://edu.epito.bme.hu/course/view.php?id=441

1.10 Language of instruction

hungarian and english

1.11 Curriculum requirements

Compulsory in the Civil Engineering (BSc) programme

1.12 Prerequisites

Strong prerequisites:

- Steel and Composite Structures (BMEEOHSAS47)

1.13 Effective date

5 February 2020

2. Objectives and learning outcomes

2.1 Objectives

The objective of the course is that the student shall be aware of the typical structural systems of steel and composite buildings, their behaviour, shall understand the design principles and gain the skill to apply them in practice, shall gain the basic skills of construction detailing and drawing (handdrawing and CAD drawing of structural members and their connections).

2.2 Learning outcomes

Upon successful completion of this subject, the student:

A. Knowledge

1. is aware of the basic terms in the field of steel and composite structures,
2. knows the code background of design of steel structures and the major design provisions,
3. is aware of the typical structural systems of steel and composite building structures (industrial – low-rise – halls, large-span structures, multistorey buildings, highrise buildings), the major components of the structural system, static behaviour of the typical systems,
4. knows the types and construction of secondary members, understands the corresponding basic design principles,
5. knows the typical floor systems and the corresponding design principles,
6. knows the typical bracing systems and the corresponding design principles,
7. is aware of basic static, buckling and dynamic analysis methods of structures,
8. knows the numerical modelling possibilities of structures,
9. understands the instability phenomena of steel and composite structures, knows the principles of stability analysis and design concepts, knows the major design methods,
10. is aware of the typical connections and their detailing, classification of connections, principles of component method,
11. understands the principles of design of structures subjected to fire, is aware of the behaviour of steel and composite structures in fire,
12. is aware of the basic analysis methods for seismic demands, understands the code background of seismic design and the major design provisions for low-ductility structures,

B. Skills

1. understands and applies the code provisions of steel and composite structure related standards,
2. is able to analyse and design secondary members,
3. completes analysis and design of composite slab,
4. develops global and local numerical model for structures or their isolated parts,
5. performs static, dynamic and buckling numerical analysis,
6. uses the reduction factor method, partial geometric imperfection method or the general method for manual or computer-aided stability analysis and verification,
7. completes verification of connections, using the component method,
8. applies the simplified procedure for verification of structures subjected to fire effects,

C. Attitudes

1. collaborates with the teacher and the student fellows in gaining knowledge,
2. actively cooperates and participates in class works,
3. is continuously gaining knowledge,
4. is open to the use of IT tools and equipments,
5. aims to learn and use tools for analysis and design of steel and composite structures,
6. aims accuracy in his/her calculations/solutions,
7. is open for criticism,
8. assesses his/her own results of any computations, corrects the errors,

D. Autonomy and Responsibility

1. responsibly completes analysis and design of structures, with fully respecting the provisions of standards, codes and laws,
2. is independent in problem statements and solutions,
3. in situations of group works, collaborates with his/her student fellows,
4. aims understanding the complexity, comprehensiveness of the problems and recognizing the synergies.

2.3 Methods

Lectures, computational practices, active involvement in and exchange of thoughts during lectures, communication in oral and written form, use IT tools and equipments, tasks to be solved individually or in group work

Numerical examples of the computational practices, class works and homeworks support the understanding and practical application of the design theory.

2.4 Course outline

Week	**Topics of lectures and/or exercise classes**
1.	Low-rise buildings (industrial halls). Lattice and truss girders.
2.	Design of secondary members.
3.	Conceptual design of industrial halls. Design of composite columns.
4.	Design of composite slabs. Composite frames.
5.	Crane girders. Bracing systems.
6.	Highrise and tall buildings. Analysis and design of steel and composite structures.
7.	Analysis and design of steel and composite structures. Modelling of structures.
8.	Stability verification of steel and composite structures.
9.	Stability verification of steel and composite structures.
10.	Connections: configurations, design.
11.	Connections: configurations, design.
12.	Connections: configurations, design.
13.	Design of steel and composite structures subjected to fire.
14.	Seismic desing.

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) Lecture notes:

- Solved numerical examples.
- Dr. Papp Ferenc: Steel Buildings. HEFOP notes.

b) Online materials:

- Dr. L G Vigh: Lecture slides
- Dr. Ferenc Papp: Design guides for steel building

c) Other electronic materials:

- ESDEP course

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.

This Subject Datasheet is valid for:

II. Subject requirements

Assessment 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 homeworks, class work (active involvement in lectures) and examination.

3.2 Assessment methods

Evaluation form	Abbreviation	Assessed learning outcomes
Homework #1	HW1	A.1-A.12; B.1-B.8; C.3-C.8; D.1-D.4
Homework #2	HW2	
Homework #3	HW3	
Homework #4	HW4	
active involvement in lectures	A	A.1-A.12; B.1, B.4-B.8; C.1-C.8; D.1-D.4
Oral exam	E	A.1-A.12; B.1-B.8; C.4-C.8; D.1-D.2, D.4

Note: homeworks are classified as Type b) as per TVSZ 110.§ (3).
The dates of midterm tests and deadlines of assignments/homework can be found in the de-tailed course schedule on the subject's website. Assessment A occurs via short class works, the date and time of which are not announced in advance.
The dates of deadlines of assignments/homework can be found in the detailed course schedule on the subject's website.

3.3 Evaluation system

Abbreviation	Score
HW1-4	30%
A	20%
Total in semester	**50%**
E	50%
Sum	**100%**

There is no individual criteria for HW1-4 and A. To obtain successful grade, the sum of HW1-4 and A shall be equal to or exceed 50% of the achievable points, and E shall be equal to or exceed 50% of the achievable points.

3.4 Requirements and validity of signature

To obtain signature, the sum of HW1-4 and A shall be equal to or exceed 50% of the achievable points.
In case of re-application for the subject the results obtained during the new semester overwrite the results obtained during any previous semesters (except for the examination course).
Semester results achieved earlier can be considered retroactively in the evaluation process of further semester in accordance to the rules of the Code of Studies and Exams (BME TVSZ).

3.5 Grading system

To obtain successful grade, attendance requirement must be fulfilled.
Grade is failed, if any of the following applies:

- if the gained points E do not achieve 50% of the achievable points,
- if the total gained points of HW1-4 + A do not achieve 50% of the achievable points.

The final grade is computed on the basis of the sum of A + HW1 + HW2 + HW3 + HW4 + E, as follows:

Grade	Points (P)
excellent (5)	85 <= P

good (4)	75 <= P< 84,5%
satisfactory (3)	60 <= P< 74,5%
passed (2)	50 <= P< 59,5%
failed (1)	P< 50 %

3.6 Retake and repeat

1. Late submission of homeworks is possible typically one week after the original deadline. In case the original deadline of a homework falls within the last week of the semester (Week 14), late submission is possible till 12:00 on the last day of the supplementary week. For the effective schedule of the homework assignments and due dates, consult the detailed course schedule of the course on the subject website.
2. “Active involvement in lectures” A cannot be repeated, cannot be substituted with other forms of activity.

3.7 Estimated workload

Activity	**Hours/semester**
contact hours	14×4=56
preparation for the lectures	14×0.5=7
homework	48
home studying of the written material	5
preparation for exam	34
Sum	**150**

3.8 Effective date

5 February 2020

This Subject Datasheet is valid for: