Thin Walled Steel Structures - BMEEOTMDT82

I. Subject Specification

1. Basic Data

1.1 Title

Thin Walled Steel Structures

1.2 Code

BMEEOTMDT82

1.3 Type

Module with associated contact hours

1.4 Contact hours

Type	Hours/week / (days)
Lecture	2

1.5 Evaluation

Exam

1.6 Credits

3

1.7 Coordinator

name	Dr. Ádány Sándor
academic rank	Professor
email	adany.sandor@emk.bme.hu

1.8 Department

Department of Structural Mechanics

1.9 Website

https://epito.bme.hu/BMEEOTMDT82
https://fiek2.mywire.org/course/view.php?id=2558

1.10 Language of instruction

hungarian and english

1.11 Curriculum requirements

Ph.D.

1.12 Prerequisites

1.13 Effective date

1 September 2022

2. Objectives and learning outcomes

2.1 Objectives

The aim of the subject is to discuss the behaviour of thin-walled members, particularly that of cold-formed steel members. Special emphasis is given to stability behaviour, as well as to state-of-the-art numerical methods that can beneficially used in stability analysis.

2.2 Learning outcomes

Upon successful completion of this subject, the student:

A. Knowledge

1. knows the most important specialties of cold-formed steel members,
2. knows the characterizing behaviour types of cold-formed steel members,
3. knows the characteristics of the typical buckling types of thin-walled members,
4. knows the special numerical methods that can beneficially applied in the stability analysis of thin-walled members, and understands the basic concepts of these methods,
5. understands the design approaches for stability of cold-formed steel members,
6. understands the basics of Eurocode design for cold-formed steel members.

B. Skills

1. is able to use special numerical methods for the stability analysis of thin-walled members,
2. is able to perform design calculations for cold-formed steel members,
3. is able to individually research a topic related to thin-walled members, by collecting and evaluating relevant background literature,
4. is able to prepare a summary/presentation on a topic related to thin-walled members.

C. Attitudes

1. openness to elaborate new problems,
2. awareness of the importance of knowing the mechanical/mathematical background of numerical/design procedures/tools,
3. awareness of the importance of seemingly small (mechanical/mathematical) details when approaching a practical problem.

D. Autonomy and Responsibility

1. completing literature review individually,
2. elaboration a topic individually,
3. preparation a scientific presentation individually.

2.3 Methods

Lectures, and individual work: preparation of a summary/presentation on a selected topic.

2.4 Course outline

Week	**Topics of lectures and/or exercise classes**
1.	Cold-formed steel members. CFS products, applications. Characteristics of CFS members. Design concepts for stability.
2.	Introduction to stability analysis. Illustration on Euler column buckling.
3.	The semi-analytical finite strip method, with sin-cos longitudinal functions.
4.	Signature curve.
5.	Generalization of shape functions.
6.	The constrained finite strip method (cFSM). Examples.
7.	cFSM interpretation, generalization, application.
8.	The constrained finite element method (cFEM). From cFSM to cFEM. Constraining a shell element. Constraining one band. Constraining a member. Examples.
9.	The spline finite strip method.
10.	CFS design. EC3 basics for CFS. Effective cross-section. Cross-section checks. Stability checks. Purlin design.
11.	Flange curling. Shear lag.
12.	Web breathing. Special fastening techniques in cold-formed steel structures.
13.	Behaviour and design of cold-formed steel members and sheets subjected to direct transverse forces.
14.	Summary

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

2.6 Other information

2.7 Consultation

This Subject Datasheet is valid for:

Thin Walled Steel Structures - BMEEOTMDT82

Inactive courses

II. Subject requirements

Assessment and evaluation of the learning outcomes

3.1 General rules

3.2 Assessment methods

Evaluation form	Abbreviation	Assessed learning outcomes
exam	E	A.1-A.6; B.1-B.4; C.1-C.3; D.1-D.3

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
E	100%
Sum	**100%**

3.4 Requirements and validity of signature

3.5 Grading system

Grade	Points (P)
excellent (5)	
good (4)	
satisfactory (3)	
passed (2)	
failed (1)	

3.6 Retake and repeat

3.7 Estimated workload

Activity	Hours/semester
Sum	

3.8 Effective date

1 September 2022

This Subject Datasheet is valid for:

Inactive courses