Steel Structures III

Code: MFACS33SS3-EN
ECTS Credit Points: 3
Evaluation: exam
Year, Semester: 3rd year/2nd semester
Number of teaching hours/week:
Lecture: **2**
Practice: **1**
Prerequisites: Steel Structures II: MFACS32SS3-EN

Topics:
Portal frames. Typical arrangement of portal frames. Imperfection. Load effects of frames. Elastic and plastic global analysis of frames. Design of members (cross-section resistance, member buckling resistance). Design of joints.
Truss structures. Typical arrangement of truss structures. Hollow section joints, types of joints in hollow sections. Failures for hollow section joints. Welded joints between CHS members. Welded joints between CHS or RHS brace members and RHS chord members. Welded joints between CHS or RHS brace members and I or H section chords. Welded joints between CHS or RHS brace members and channel section chord members.

Literature:
EN 1990:2002/A1:2005 Eurocode - Basis of structural design.
EN 1991-1-1:2002 Eurocode 1: Actions on structures - Part 1-1: General actions - Densities, self-weight, imposed loads for buildings.
MSZ EN 1993-1-1: 2009 Design of steel structures Part 1-1.:General rules and rules for buildings
MSZ EN 1993-1-8: 2005 Design of steel structures Part 1-8.:Design of joints
EN 1993-1-8:2005, Eurocode 3: Design of steel structures - Part 1-8: Design of joints
Design of Steel Portal Frames for Europe, University of Edinburgh, 2011

Schedule

1st week: Preparation, description of subject requirements, course schedule description, description of the course literature lists, registration week. Short summary of the previously discussed problems of steel structures. **2nd week:** **Lecture:** Fabrication and construction technologies of steel structures. **3rd week:** **Lecture:** The most commonly used welding technologies constructing steel structures. **Practice:** Outgiving and discussion of the design task.	**7th week:** **Lecture:** Special design problems of welded steel girders I. **Practice:** Design examples for welded steel girders I. **8th week:** **TEST1** **9th week:** **Lecture:** Special design problems of welded steel girders II. **Practice:** Design example for welded steel girders II. **10th week:** **Lecture:** Classifications and types of steel struts I. **Practice:** Design of steel struts. Different

4th week: **Lecture:** Presentation of different steel based construction systems, Chapter I: Lindab System. **Practice:** Using of the Lindab Design Guidelines in practice **5th week:** **Lecture:** Presentation of different steel based construction systems, Chapter II: Lindab System. **Practice:** Usage of the Lindab Design Guidelines in practice **6th week:** **Lecture:** Presentation of different steel based construction systems, Chapter III: Astron System. **Practice:** Usage of the Astron Design Guidelines in practice. Consultation.	design examples for steel struts I. **11th week:** **Lecture:** Classifications and types of steel struts II. **Practice:** Design of steel struts. Different design examples for steel struts II. **12th week:** Industrial visit I – Visit at a prefabrication industry. **13th week:** Industrial visit II – Visit at a steel portal hall. **14th week:** **TEST2** **15th week:** **Lecture:** Consultation. **Practice:** Consultation. **Handing in of the Design Task**

Requirements

Attendance at **lectures** is **strongly recommended**, but not compulsory. Participation at **practice** is **compulsory**. Students must attend practice classes and may not miss more than three times during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Students can't make up a practice with another group.
Attendance at lectures and practice classes will be recorded by the staff of the department. Being late is counted as an absence. In case of further absences, a medical certificate needs to be presented. Missed practice classes should be made up for at a later date, being discussed with the tutor. Students are required to bring a calculator and the printed materials of the lectures to each lecture and practice class. Active participation is evaluated by the teacher every class. Students' active participation is required.

Students have to **submit all the two tests and the design task** as scheduled minimum at a sufficient level. During the semester there are two tests – the 1st test in the 8th week and the 2nd test in the 14th week – and there is a design task. In order to get the **signature**, the minimum points of test and design task have to be taken (min. 50 points of 80 points). In order to take an exam grade – minimum (2) pass grade – minimum points of tests and design tasks as well as exam points have to be taken (Summa minimum 61 points of 100 points). The minimum and the maximum points related to the tests and the design task can be obtained are the following:

Two tests:				
Test I:	Maximum:	**20 points**	Minimum:	**12 points**
Test II:	Maximum:	**20 points**	Minimum:	**12 points**
	Summa:	**40 points**		**24 points**
Design task:	Maximum:	**40 points**	Minimum:	**26 points**
Points required for a signature:				
	Maximum:	**80 points**	Minimum**:**	**50 points**

(In case of having min. 50 points from the Tests and from the Design Task, signature can be obtained)

Exam:				
	Maximum:	**20 points**	Minimum:	**11 points**
Summa points:				
	Maximum:	**100 points**	Minimum:	**61 points**

The course ends in an **exam grade**. Based on the summa points of the tests, the summa points of the design task and the summa point of the exam, the exam grade is defined according to the following calculation:

	Score		**Grade**	
	0 – 60	points:	fail	(no sign)
	61 – 70	points:	pass	(2)
	71 – 80	points:	satisfactory	(3)
	81 – 90	points:	good	(4)
	91 – 100	points:	excelent	(5)