**Steel Structures II.**

**Code: MFACS32SS3-EN**

**ECTS Credit Points: 3**

**Evaluation: exam**

Year, Semester: 3rd year/1st semester

Number of teaching hours/week:

Lecture: **2**

Practice: **1**

**Prerequisites:** Steel Structures I.: MFACS31S03-EN

**Topics**:

Different forms of steel structures. Ductile properties of kinds of steel material. Material models. Taking into account the secondary effects on steel structures. Classification of structural elements under compression and bending. Calculating the resistance of structural elements under simultaneous compression and bending. Design of split-section bars. Design of steel frame structures. Construction and resistance of end-plate connections. Stiffness of end-plate connections. Simplified design of end-plate connections. Design of structures with semi-rigid joints. Fatigue and brittle fracture of steel structures.

**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

**Schedule**

|  |  |
| --- | --- |
| **1st week:**Preparation, description of subject requirements, course schedule descriptions, describing of the course literature list, registration week.**2nd week:** **Lecture:** Different forms of steel structures. Ductile properties of kinds of steel material. Material models.**Practice:** Outgiving and discussion of design tasks.**3rd week:** **Lecture:** Taking into account the secondary effects on steel structures.**Practice:** Controlling the sketch plan and the load combinations.**4th week:** **Lecture:** Classification of structural elements under compression and bending. Calculating the resistance of structural elements under compression and bending.**Practice:** Classification of structural elements of the design task. Calculating the resistance of the structural elements.**5th week:** **Lecture:** Calculating the resistance of structural elements under simultaneous compression and bending.**Practice:** Example tasks on calculating the resistance of structural elements under simultaneous compression and bending.**6th week:** **Lecture:** Design of split-section bars.**Practice:** Example tasks on calculating the resistance of split-section bars.**7th week:** **Lecture:** Design of steel frame structures.**Practice:** Consultation | **8th week:** **TEST1****9th week:** **Lecture:** Construction and resistance of end-plate connections. **Practice:** Example tasks on calculating the resistance of end-plate connections. **10th week:** **Lecture:** Stiffness of end-plate connections. **Practice:** Example tasks on calculating the stiffness of end-plate connections. **11th week:** **Lecture:** Simplified design of end-plate connections.**Practice:** Example tasks on using the simplified design of end-plate connections.**12th week:** **Lecture:** Stiffness of joints. Categorization. Design of structures with semi-rigid joints.**Practice:** Example tasks on calculating the resistance of split-section bars.**13th week:** **Lecture:** Fatigue and brittle fracture of steel structures.**Practice:** Consultation.**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** class is **compulsory**. Students must attend the 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 class with another group. Attendance at lectures and at 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 practices should be made up for at a later date, being discussed with the tutor. Students are required to bring the calculator and the printed materials of the lectures to each lecture and practice class. Active participation is evaluated by the teacher in every class. Active student’s participation should be 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**, minimum point of test and design task has to be taken (min. 50 points from 80 points). In order to get an exam grade (ESE) – minimum (2) pass grade – minimum point of tests and design tasks as well as exam points has to be taken (Summa minimum 61 points from 100 points). The minimum and the maximum points related to the tests and design tasks 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 sign:**

Maximum: **80 points** Minimum**: 50 points**

(In case of having min. 50 points from the Tests and from the Design Tasks, sign 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 (ESE)**. Based on the summa points of the tests, the summa points of the design tasks and the summa points 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)