**Steel buildings**

**Code: MFMAC31SM3-EN**

**ECTS Credit Points: 3**

**Evaluation: mid-semester grade**

Year, Semester: 4th year/1st semester

Number of teaching hours/week:

Lecture: **2**

Practice: **1**

**Prerequisites:** Steel Structures III.: MFACS33SS3-EN

**Topics**:

Classification and types of steel buildings. Bracing systems of steel buildings. Special steel struts in steel buildings. Detailing of steel frames and struts. Design of steel crane girders. Design of steel quilt structures. Classification, types and design problems of thin-wall structural elements. Cross section class IV. Some problems of the steel-composite structures used in steel buildings. Fatigue, brittle fracture and fire resistance of steel structures. Case studies.

**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**

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| --- | --- |
| **1st week:**Preparation, description of subject requirements, course schedule description, description of the course literature list, registration week. **2nd week:** Type and classification of steel buildings.**Practice: Outgiving and discussion of the design task.****3rd week:** **Lecture:** Bracing systems of steel frames. Fixed column foots.**Practice:** Detailing of steel structures.**4th week:** **Lecture:** Classifications and types of steel struts used in steel buildings I. **Practice:** Loads and forces of the bracing system.**5th week:** **Lecture:** Classifications and types of steel struts used in steel buildings II. **Practice:** Detailing of the struts and their joints.**6th week:** **Lecture:** Design and special problems of steel crane girders.**Practice:** Examples for design of crane girders.**7th week:** **Lecture:** Design and special problems of quilt girders.**Practice:** Design example for a quilt girder. | **8th week:** **TEST1****9th week:** **Lecture:** Classification and types of the thin-wall steel structures.**Practice:** Calculation and details of thin-wall structures. **10th week:** **Lecture:** Special problems of cross section class IV.**Practice:** Design of CSC IV.**11th week:** **Lecture:** Some special problems of steel-concrete composite structures. **Practice:** Designexamples for simple composite girders.**12th week:** **Lecture:** Fatigue of steel structures. Problems of the brittle fracture. Fire resistance of steel structures.**Practice:** Simplifieddesignexamples for checking fire resistance.**13th week:** Case studies for steel structures, steel buildings.**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 classes** 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 at practice classes will be recorded by the staff of the department. Being late is equivalent with 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 in every class. Active student’s participation should be required.

Students have to **submit all the two tests and one 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 the tests and the design task have to be taken (min. 50 points of 80 points). In order to take an exam grade **(ESE)** – minimum (2) pass grade – minimum points of tests and the design task 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 sign:**

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

(In case of having min. 50 points for the Tests and for 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 (ESE)**. 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: excellent (5)