**Strength of Materials**

**Code:** MK3MEC3S8SX17EN

**ECTS Credit Points:** 8

**Evaluation:** Exam

**Year, Semester:** 2nd year, 3rd semester

**Its prerequisite:** MK3MEC2S8SX17EN

**Further courses are built on it:** Yes

**Number of teaching hours/week**:

Lecture: 0

Practice: 6

**Topics**:

Definitions, attributes of the cross-sectional polygons. Characterization of the state of stress, Characterization of the state of strain. Material laws. Elastic beam model. State variables of a beam element, Equations of the beam element. Simple loading. Combined loading. State of stress, principal stresses. Displacements of the beams. Work theorems. Buckling of solid columns.

**Literature:**

*Compulsory:*

Beer, Johnston: Mechanics of materials (7th edition, 2015), ISBN-13: 978-0073398235

*Recommended:*

Budynas: Advanced Strength and Applied Stress Analysis (2nd edition, 1998), ISBN-13: 978-0070089853

**Schedule**

|  |  |
| --- | --- |
| **1st week Registration week** | |
| **2nd week**  **Practice: :** Introduction, Attributes of the cross-sectional polygon | **3rd week:**  **Practice:** Stresses, strains and material laws |
| **4th week:**  **Practice:** State variables of a beam element, , Equations of the beam element, Simple loading I. Centric tension or compression | **5th week:**  **Practice:** Simple loading II Simple shear, Twisting |
| **6th week:**  **Practice:** Simple loading III Bending, **mid-term test** | **7th week:**  **Practice:** Trip. |
| **8th week: 1st drawing week** |  |
| **9th week:**  **Practice:** Combined loading I Beam shear (with bending) | **10th week:**  **Practice:** Combined loading II Eccentric tension or compression |
| **11th week:**  **Practice:** State of stress, principal stresses | **12th week:**  **Practice:** Calculation of displacement I Elastic curve Small displacement theory |
| **13th week:**  **Practice:** Work theorems Theorem of virtual forces, Calculation of displacement II | **14th week:**  **Practice:** Buckling of solid columns  **End-term test** |
| **15th week: 2nd drawing week** | |

**Requirements**

**A, for a signature:**

Participation at **practice** 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 with another group. Attendance at practice will be recorded by the practice leader. Being late is counted as an absence. In case of further absences, a medical certificate needs to be presented. Students are required to bring a calculator to each practice class. Active participation is evaluated by the teacher in every class. If a student’s behaviour or conduct doesn’t meet the requirements of active participation, the teacher may evaluate his/her participation as an absence due to the lack of active participation in class.

During the semester there are two tests: the mid-term test in the 6th week and the end-term test in the 14th week. A student once can retake test in both topics, if it is necessary.

**Tests:**

1. Test: Maximum: **25 points**

2. Test: Maximum: **25 points**

Summa: **50 points** Minimum **33 points**

**50×1.5=75 points 50 points**

**B, for a grade:**

The course ends in an **examination grade** based on the points of the tests and the exam. The sum points which are given for the two tests is multiplied with 1.5 and added to the points of the exam.

**Exam** Maximum: **25 points** Minimum: **10 points**

**Summa points** Maximum: **100 points** Minimum: **60 points**

A grade is given according to the following table:

Score Grade

0-59 fail (1)

60-69 pass (2)

70-79 satisfactory (3)

80-89 good (4)

90-100 excellent (5)