

Theory of Design & Approximate Calculations

Code: MK3TAR1S4SX17-EN

ECTS Credit Points: 4

Evaluation: mid-semester grade

Year, Semester: 2nd year, 4th semester

Its prerequisite(s): Strength of Materials

Further courses are built on it: Yes/No

Number of teaching hours/week (lecture + practice): 4+0

Topics:

Reviewing the basic knowledge of mechanics and mathematics. Tasks of mechanics and mathematics. Discussing the Eurocode standard. Building and supporting structures. Forms of failure. Modelling Issues. Ways of building. Idealized support, support types, hierarchical structure, a two-dimensional structural model. Theory of building design basics. The capacity, safety, risk, life, the concept of reliability; strength and stability. The primary structural systems, deconstructing, contacts, supports. Demonstrating them on simple buildings. Weight; inclusion of standard payload. Examples to weight analysis, the dead load and determine the payload. Meteorological loads: snow load, wind load. Examples of weight analysis, the dead load and the live load. Snow load and wind load determination. The effect of temperature change. Loads under construction; extraordinary loads, fire effects. Examples of the determination of charges under construction. Different load conditions. Standard load combinations. Examples of standard load combinations. State of emergencies. Calculation in case of complex structures and load combinations.

Literature:

Compulsory:

- MSZ-EN-1990-2002/A1 Eurocode
- MSZ-EN-1991-1-7 Eurocode
- MSZ-EN-1998-1 Eurocode
- Gulvanessian, H., Formichi P., Calgaro J-A.: Designers' Guide to Eurocode 1: Actions on Buildings, Thomas Telford Publishing, , 2009, ISBN 978-0727731562

Schedule

1st week Registration week

2nd week:

Lecture: Introduction. Reviewing the basic knowledge of mechanics and mathematics. Training Tasks of mechanics and mathematics. Discussing the Eurocode standard.

4th week:

Lecture: Theory of building design basics. The capacity, safety, risk, life, the concept of reliability; strength and stability. The primary structural systems, deconstructing, contacts, supports. Demonstrating them on simple buildings.

6th week:

3rd week:

Lecture: Building and supporting structures; supporting structures requirements; its forms of failure. Modelling Issues: Ways of buildings; idealized support, support types, hierarchical structure, a two-dimensional structural model. Training Tasks of mechanics and mathematics.

5th week:

Lecture: Constant burden: weight; inclusion of standard payload. Examples to weight analysis, the dead load and determine the payload.

7th week:

Lecture: Meteorological loads: snow load, wind load. Examples of weight analysis, the dead load and determine the payload. Examples of snow load and wind load determination.

Lecture: Wind load, the effect of temperature change. Examples of snow load and wind load determination. Consultation.

8th week: 1st drawing week

9th week:

Lecture: Loads under construction; extraordinary loads, fire effects. Examples of the determination of charges under construction presentation of the impact of fire and earthquakes.

11th week:

Lecture: Standard load combinations. The dimensioning of structures, specific questions. State of emergencies. Examples of standard load combinations.

13th week:

Lecture: Load combinations. Examples and calculation. Mid-term test.

10th week:

Lecture: Simultaneity, different load conditions; Preparation of the standard load combinations. Examples of standard load combinations.

12th week:

Lecture: Internal forces. Calculation in case of complex structures and load combinations.

14th week:

Lecture: Repetition of mid-term test. Assessment of homework. Closing of semester.

15th week: 2nd drawing week

Requirements

Obligatory semester project work

Homework: Maximum: **50 points** Minimum: **26 points**

Obligatory mid-term test

Mid-term test: Maximum: **50 points** Minimum: **26 points**

The course ends with **mid-semester grade**. Based on the summa points of the tests and the summa points of the homework assignments, the mid-semester grade is defined according to the following calculation:

Score	Grade
0 – 50 points:	fail (no sign)
51 – 62 points:	pass (2)
63 – 74 points:	satisfactory (3)
75 – 86 points:	good (4)
87 – 100points:	excellent (5)