

## Basics of Structural Engineering (E051510)

**Course size** (nominal values; actual values may depend on programme)

**Credits** 9.0      **Study time** 270 h      **Contact hrs** 75.0 h

**Course offerings and teaching methods in academic year 2017-2018**

A (semester 1)	seminar: coached exercises	30.0 h
	lecture	45.0 h

**Lecturers in academic year 2017-2018**

Van Coile, Ruben	TW14	lecturer-in-charge
Snoeck, Didier	TW14	co-lecturer

**Offered in the following programmes in 2017-2018**

	crdts	offering
<a href="#">Bridging Programme Master of Science in Fire Safety Engineering</a>	9	A
<a href="#">International Master of Science in Fire Safety Engineering</a>	9	A
<a href="#">Master of Science in Fire Safety Engineering</a>	9	A

**Teaching languages**

English

**Keywords**

Basics of structural analysis, steel structures, concrete structures

**Position of the course**

In this course students (engineers) acquire within an international context the essential, scientific principles of the design of steel and concrete structures at environmental temperature. This course fulfills the basic competence of the master of fire safety engineering: being able to apply scientific knowledge for understanding, critically evaluating and analyzing the fire phenomenon and its consequence.

**Contents**

- Basic principles: bearing and loading systems, general strength and stiffness conditions
- Steel structures: principles of the calculation of steel structures, classification of sections; buckling of columns; basic design of beams subjected to bending, shear and combined bending; welded and bolted connections; lateral-torsional buckling
- Concrete structures: introduction concrete technology, general calculation assumptions, verification of ultimate limit state in centric compression, single bending with or without longitudinal force and shear force, verification serviceability limit state, practical reinforcement details, general principles of prestressed concrete

**Initial competences**

Having insight into the basic principles of applied mechanics and material science

**Final competences**

- 1 To be able to design an ordinary steel construction so that the strength conditions are fulfilled (except for instability phenomena not treated in the course, such as folding of plates etc.)
- 2 To be able to design a simple welded and bolted connection
- 3 Calculating the resistance of a structural element subjected to lateral-torsional buckling
- 4 Understand the effect of imperfections on the behaviour of structures
- 5 Being able to determine the needed amount of longitudinal and shear reinforcement in beams and columns in order that the conditions in serviceability limit state and ultimate limit state are fulfilled

- 6 To be able to propose a practical arrangement of the reinforcement in beams and columns
- 7 Understand the basic principles of prestressed concrete and being able to perform an easy design of a prestressed beam

**Conditions for credit contract**

This course unit cannot be taken via a credit contract

**Conditions for exam contract**

This course unit cannot be taken via an exam contract

**Teaching methods**

Lecture, seminar: coached exercises

**Learning materials and price**

Syllabus

Price: 30 Euro

**References****Course content-related study coaching**

The lecturers and assistants can be contacted before or after the lectures or exercise sessions, through e-mail or after making an appointment

**Evaluation methods**

end-of-term evaluation

**Examination methods in case of periodic evaluation during the first examination period**

Written examination, oral examination

**Examination methods in case of periodic evaluation during the second examination period**

Written examination

**Examination methods in case of permanent evaluation****Possibilities of retake in case of permanent evaluation**

not applicable

**Extra information on the examination methods**

Periodic evaluation: oral closed-book exam with written preparation related to the theory (1st examination period) - written closed-book exam related to the theory (2nd examination period); written open-book exam related to the exercises

**Calculation of the examination mark**

50% on the partim steel structures (1/3 on theory, 2/3 on exercises)

50% on the partim concrete structures (1/3 on theory, 2/3 on exercises)