

# Course Specifications

From the academic year 2017-2018 up to and including the

## Structural Load-Bearing Systems in Architectural Design (E042800)

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

Credits	3.0	Study time	90 h	Contact hrs	30.0 h
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Course offerings and teaching methods in academic year 2018-2019

A (semester 2)	Dutch	lecture	15.0 h
		seminar: coached	15.0 h
		exercises	

Lecturers in academic year 2018-2019

Belis, Jan	TW14	lecturer-in-charge
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Offered in the following programmes in 2018-2019

	crdts	offering
<a href="#">Bachelor of Science in Engineering: Architecture</a>	3	A
<a href="#">Preparatory Course Master of Science in Engineering: Architecture (main subject Architectural Design and Construction Techniques)</a>	3	A
<a href="#">Preparatory Course Master of Science in Engineering: Architecture (main subject Urban Design and Architecture)</a>	3	A

Teaching languages

Dutch

Keywords

Structures, stability, strength, stiffness, limit states, Eurocodes

Position of the course

Structural Load-bearing Systems in Architectural Design is one of the basic courses of the bachelor formation in architecture. It builds further on the fundamental concepts of Statics and Strength of Materials, and offers a sound base for advanced teaching on Steel and Concrete Construction and general constructional principles.

The aims are (i) to teach the general ideas and methods with which the mechanical behaviour of load bearing systems can be explained, understood and evaluated, (ii) to be able to assess the stability, strength and stiffness of architectural building according to design regulations that are used in the internationally accepted structural Eurocodes, (iii) to learn specific methods of analysis for commonly used line forming elements such as beams, columns, frames and trusses, arches and cables, and surface forming elements such as plates and shells, and finally (iv) to underline the importance of bracing systems from a point of view of general stability of the assembly of structural components. It is remarked that the main idea of the course focuses on an integrative approach where application software is used as didactic material and where the traditionally hard boundaries of the domains of statics of structures, materials science and strength of materials disappear.

Structural Load-bearing Systems in Architectural Design contributes to the acquisition of knowledge competence and of general scientific and intellectual ability of the academically formed bachelor in architecture.

Contents

- Part 1: Introductory concepts: General introduction and classification of support systems, Introduction to structural analysis and design, Load combinations according to Eurocodes
- Part 2: Behaviour and design of structural systems: Equilibrium of a deformable structure, Isostatic and hyperstatic beams, Trusses and funicular systems: cables and arches, Post and beam frames, Floors, plates, walls and kernels, Software-based exploratory structural analysis
- Part 3: Principles of structural design: Properties of structural hierarchies, Design for lateral forces, Comparative study of stiffeners

## Initial competences

Statics of structures, Introduction to strength of materials, Basic courses on mathematics and physics

## Final competences

- 1 Correctly use specific technical terminology.
- 2 Compose equilibrium equations for parts of the structure.
- 3 Distinguish isostatic and statically undetermined structures.
- 4 Recognise different components in the organisation of the loadbearing structure.
- 5 Apply the semi-probabilistic approach according to the Eurocodes.
- 6 Calculate the effects of temperature and settlements.
- 7 Select a suitable loadbearing system in function of the force transfer.
- 8 Model load-bearing structures and their components.
- 9 Determine the design value of multiple actions.
- 10 Calculate forces and deformations in isostatic and hyperstatic structures.

## Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

## Conditions for exam contract

This course unit cannot be taken via an exam contract

## Teaching methods

Lecture, seminar: coached exercises

## Learning materials and price

Lecture notes, in Dutch (ca. 15 EUR)

## References

- Structures - 4th edition, Daniel L. Schodek, Prentice Hall, Inc., 2001, ISBN : 0-13-027821-1

## Course content-related study coaching

Teaching staff is available just before and after classes.

## Evaluation methods

end-of-term evaluation

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

Open book examination

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

Open book examination

## Examination methods in case of permanent evaluation

## Possibilities of retake in case of permanent evaluation

not applicable

## Extra information on the examination methods

During examination period: written open-book exam; written open-book exam - problems.

## Calculation of the examination mark

The final score is determined based on the following components and weight factors:  
Theory: 1/3 ; Exercises: 2/3.