Structural Engineering and Design: Advanced Structural Engineering elective package

Structural Engineering and Design: Advanced Structural Engineering	
Offered by	Department of Faculty of the build environment
Language	English
Primarily interesting for	All students
Prerequisites	Required courses: 7P3X0 (Statics of structures, Bachelor College Year 1 Quartile 3) 7PPX0 (Dimensioning of structures, Bachelor College Year 2 Quartile 2) 7P3X0 (Statics of structures, Bachelor College Year 1 Quartile 3) 7PPX0 (Dimensioning of structures, Bachelor College Year 2 Quartile 2) Recommended courses: -
Contact person	Dr.ir. A. Vermeltfoort (a.t.vermeltfoort@tue.nl) Ir. B.W.E.M. van Hove (b.w.e.m.v.hove@tue.nl)

Content and composition

The unit Structural Design delivers two coherent course packages: Structural Engineering Essentials (two courses) and Structural Engineering Advanced (three courses).

The combination of both coherent course packages forms an essential preparation when focusing on the unit Structural Design (SD) within the Graduate School. Later on, when following your graduate school program within the section SD, the courses and end project will lead to a proper preparation for a future function as Structural Engineer, Structural Designer or Structural Researcher.

Further, the separate coherent package Structural Engineering Essentials forms basic knowledge for students with a focus on Architectural and Urban Design and Engineering (AUDE) and special interest in technical aspects of architectural design.

At the end of the bachelor program the unit SD offers two different types of bachelor end projects:

1) Structural design of a medium sized building
2) Parametric and generative design

Examples of 1)

Examples of 2)

Structural Engineering and Design: Advanced Structural Engineering elective package

Course code	Course name	Level classification
2DBA0	Matrices and differential equations	-
7P8X0	Concrete and masonry structures	-
7P0X0	Steel structures and applied mechanics	-

Course description

Matrices and differential equations (2DBA0)
This course is taught by the Faculty of applied mathematics, specially focusing on matrices and differential equations to be applied in structural engineering. Contents and level of the mathematical themes are focused on students of the Faculty of the build environment without any academic mathematical pre-knowledge on this subject. The course delivers proper knowledge for students interested in structural engineering. This knowledge forms the basis for further mechanical themes like analysis of materials, analysis of structures and stability of structures. These themes are not subject of the bachelor college, but included in structural design core courses of the graduate school. Course code, course name Provide a summary/description of the content, learning goals, etc.

Concrete and masonry structures (7P8X0)
The course combines lectures on two materials (concrete and masonry) that are similar from a structural point of view. During this course students will learn how to deal with the advantages of the typical materials properties in structural designs and realize safe structures. At the end of the course the student understands the material properties and the structural nature of both materials. The main objectives of the course is to provide students with tools to design safe reinforced concrete and masonry structures, from a pragmatic point of view. 'Pragmatic' here means that at the end of the course, students will be able to design basic structural elements by means of the Eurocodes. Some examples are the first order analysis of shear walls, the second order analysis of columns and the overall stability of a medium-sized masonry building.

Steel structures and applied mechanics (7P0X0)
In this course several mechanical themes are worked out and applied on steel structures. Relevant mechanical subjects are treated, such as stress mechanics (axial stresses and shear stresses), the resistance of cross-sections (elastic, plastic, composite), failure of frames, and buckling of elements. Instability of steel frames and buckling of steel elements (beams and columns) form an important subject of the course. Further, special subjects such as fire safety, conservation and connections of steel structures are part of the course.