

SYLLABUS

Name: Masonry & Timber Structures (BudAB>SI3MASTIS19)

Name in Polish:

Name in English: Masonry & Timber Structures

Information on course:

Course offered by department: Faculty of Civil Engineering
Course for department: Silesian University of Technology
Term: Winter semester 2025/2026
Cordinator of course edition: Prof. dr hab. inż. Jan Kubica

Default type of course examination report:

ZAL

Language:

English

Course homepage:

<https://platforma2.polsl.pl/rb/course/view.php?id=659>

Short description:

The aim of the subject is to get students to acquaint with the specificity of the designing and execution of timber and masonry structures elements, as well as structural materials and computational procedures according to standards (within ULS and SLS). Acquiring the skills of designing simple masonry and timber structures.

Description:

LECTURES - 15h,

MASONRY:

Materials using in masonry structures, classification of masonry units, masonry under compression, modulus of elasticity and shear modulus, complex state of stress. (2) Limit States design, determination of all components of eccentricity, masonry structures mainly loaded vertically according to EN 1996-1-1. (3) Masonry subjected to bending, external not load-bearing walls, walls subjected to concentrated loads. (4) Simplified calculation methods given in EN 1996-3.

TIMBER:

Timber as structural material, features, appearance, timber species, structure of timber, mechanical properties, failure modes. (2) The basic assumptions of the standard PN-EN-1995-1-1: 2010. (3) Calculation and dimensioning methods according to PN-EN-1995-1-1: 2010 including: Ultimate Limit State (ULS) and Serviceability Limit State (SLS). (4) Typical timber roof structures - construction and calculation.

CLASSES - 4h,

MASONRY & TIMBER:

Presentation and discussion of two project methodologies of the masonry building with timber floor and roof structures subjected to wind action and imposed loads.

PROJECT - 10h,

MASONRY:

Verification of load-bearing capacity of unreinforced masonry column subjected to vertical compression in both orthogonal directions – detailed method (continuous model) and simplified method.

TIMBER:

Design of purlin roof elements (rafter, purlin and post)

Bibliography:

- 1) EN-1996-1-1:2005: „Eurocode 6 – Design of masonry structures Part 1-1: General rules for reinforced and unreinforced masonry structures rules for reinforced and unreinforced masonry structures”. CEN
- 2) EN 1996-3: 2005: „Eurocode 6 – Design of masonry structures Part 3: Simlified calculation methods for unreinforced masonry structures.”. CEN
- 3) EN 1995-1-1: 2010 „Eurocode 5 – Design of timber structures, Part 1-1: General rules and rules for buildings. ” CEN
- 4) Hendry A.W., Sinha B.P., Davies S.R.: Design of Masonry Structures. E & FN SPON – an Imprint of Chapman & Hall. Taylor & Francis 2004.
- 5) Borgstrom E.: Design of timber structures. Structural aspects of timber construction. Swedish Wood, 2016.

Learning outcomes:

KNOWLEDGE:

The student knows and understands:

- the principles of construction, dimensioning and structural analysis in the field of statics and stability of masonry and timber structures (effect K1A_W05),
- the standards and guidelines for the design of selected general and industrial buildings of masonry and timber structures (effect K1A_W06).

SKILLS:

The student can:

- performs the load combination and the standard load combination for the construction works in accordance with the relevant design situationa at the limit state (effect K1A_U02),
- size selected structural elements and design simple timber and masonry structures (effect K1A_U04).

Assessment methods and assessment criteria:

PREREQUISITES:

Knowledge of basic analyses and calculations in the field of mechanics and strength of materials.

METHODS OF ASSESSING THE COURSE:

- 1) active and registered class attendance,
- 2) passing the test of both parts with a positive mark,
- 3) successive preparation and consulting of the project,
- 4) submission of the project along with its defense.

USOSweb: Szczegóły przedmiotu: BudAB>SI3MASTIS19, w cyklu: 2025/2026-Z, jednostka dawcy: <brak>, grupa przedm.: <brak>

FINAL ASSESSMENT:
60% test + 40% project

In order to have partial grades rewritten, students should contact the instructor within the first two weeks of the course.

The syllabus is valid from the summer semester of the 2025/2026 academic year, and its content is not subject to change during the semester.

Information on course edition:

Default type of course examination report:

ZAL

Short description:

The course familiarises students with the specifics of designing and construction of timber and masonry structural elements, as well as construction materials and calculation procedures in accordance with the relevant, applicable design standards based on the limit state method and the Eurocode series of standards (Eurocode 5 and Eurocode 6).

Description:

The scope of the TIMBER STRUCTURES course covers issues related to the characteristics of wood as a building material and the design (calculation) of this type of structure according to EN 1995-1-1. In particular, it covers the calculation and dimensioning of typical timber roof structures - both construction and calculation.

The MASONRY STRUCTURES course covers the basic materials used in masonry structures, including their mechanical characteristics, principles of masonry construction, and principles for calculating masonry structures subjected to compressive forces, shear, and in-plane and out-of-plane bending. The calculation principles are based on the provisions of EN 1996-1-1. Additionally, assumptions for simplified calculation methods according to EN 1996-3 are presented.

Bibliography:

missing bibliography in English

Details of classes and study groups

lecture (15 hours)

Bibliography:

- 1) EN-1996-1-1:2005: „Eurocode 6 – Design of masonry structures Part 1-1: General rules for reinforced and unreinforced masonry structures rules for reinforced and unreinforced masonry structures”. CEN
- 2) EN 1996-3: 2005: „Eurocode 6 – Design of masonry structures Part 3: Simplified calculation methods for unreinforced masonry structures.”. CEN
- 3) EN 1995-1-1: 2010 „Eurocode 5 – Design of timber structures, Part 1-1: General rules and rules for buildings. ” CEN
- 4) Hendry A.W., Sinha B.P., Davies S.R.: Design of Masonry Structures. E & FN SPON – an Imprint of Chapman & Hall. Taylor & Francis 2004.
- 5) Borgstrom E.: Design of timber structures. Structural aspects of timber construction. Swedish Wood, 2016.

Learning outcomes:

KNOWLEDGE:

The student knows and understands:

- the principles of construction, dimensioning and structural analysis in the field of statics and stability of masonry and timber structures (effect K1A_W05),
- the standards and guidelines for the design of selected general and industrial buildings of masonry and timber structures (effect K1A_W06).

SKILLS:

The student can:

- performs the load combination and the standard load combination for the construction works in accordance with the relevant design situation at the limit state (effect K1A_U02),
- size selected structural elements and design simple timber and masonry structures (effect K1A_U04).

Assessment methods and assessment criteria:

PREREQUISITES:

Knowledge of basic analyses and calculations in the field of mechanics and strength of materials.

METHODS OF ASSESSING THE COURSE:

- 1) active and registered class attendance,
- 2) passing the test of both parts with a positive mark,
- 3) successive preparation and consulting of the project,
- 4) submission of the project along with its defense.

FINAL ASSESSMENT:

60% test + 40% project

In order to have partial grades rewritten, students should contact the instructor within the first two weeks of the course.

The syllabus is valid from the summer semester of the 2025/2026 academic year, and its content is not subject to change during the semester.

Classes topics:

MASONRY:

Materials used in masonry structures, classification of masonry units, masonry under compression, modulus of elasticity and shear modulus, complex state of stress. (2) Limit States design, determination of all components of eccentricity, masonry structures mainly loaded vertically according to EN 1996-1-1. (3) Masonry subjected to bending, external not load-bearing walls, walls subjected to concentrated loads. (4) Simplified calculation methods given in EN 1996-3.

TIMBER:

Timber as structural material, features, appearance, timber species, structure of timber, mechanical properties, failure modes. (2) The basic assumptions of the standard PN-EN-1995-1-1: 2010. (3) Calculation and dimensioning methods according to PN-EN-1995-1-1: 2010 including: Ultimate Limit State (ULS) and Serviceability Limit State (SLS). (4) Typical timber roof structures - construction and calculation.

Study groups details

Group number 1

Class instructors:

Dr inż. Szymon Dawczyński

Dr hab. inż. Marta Kałuża

classes (4 hours)

Bibliography:

- 1) EN-1996-1-1:2005: „Eurocode 6 – Design of masonry structures Part 1-1: General rules for reinforced and unreinforced masonry structures rules for reinforced and unreinforced masonry structures”. CEN
- 2) EN 1996-3: 2005: „Eurocode 6 – Design of masonry structures Part 3: Simplified calculation methods for unreinforced masonry structures.”. CEN
- 3) EN 1995-1-1: 2010 „Eurocode 5 – Design of timber structures, Part 1-1: General rules and rules for buildings. ” CEN

Learning outcomes:

The student knows and understands:

- the standards and guidelines for the design of selected general and industrial buildings of masonry and timber structures (effect K1A W06).

Assessment methods and assessment criteria:

Not classified.

Classes topics:

MASONRY & TIMBER:

Presentation and discussion of two project methodologies of the masonry building with timber floor and roof structures subjected to wind action and imposed loads.

Study groups details

Group number 1

Class instructors:

Dr inż. Szymon Dawczyński

project (10 hours)

Bibliography:

- 1) EN-1996-1-1:2005: „Eurocode 6 – Design of masonry structures Part 1-1: General rules for reinforced and unreinforced masonry structures rules for reinforced and unreinforced masonry structures”. CEN
- 2) EN 1996-3: 2005: „Eurocode 6 – Design of masonry structures Part 3: Simplified calculation methods for unreinforced masonry structures.”. CEN
- 3) EN 1995-1-1: 2010 „Eurocode 5 – Design of timber structures, Part 1-1: General rules and rules for buildings. ” CEN
- 4) Hendry A.W., Sinha B.P., Davies S.R.: Design of Masonry Structures. E & FN SPON – an Imprint of Chapman & Hall. Taylor & Francis 2004.

Learning outcomes:

- SKILLS:
- The student can:
- performs the load combination and the standard load combination for the construction works in accordance with the relevant design situation at the limit state (effect K1A_U02),
 - size selected structural elements and design simple timber and masonry structures (effect K1A_U04).

Classes topics:

MASONRY:

Verification of load-bearing capacity of unreinforced masonry column subjected to vertical compression in both orthogonal directions – detailed method (continuous model) and simplified method.

TIMBER:

Design of purlin roof elements (rafter, purlin and post)

Study groups details

Group number 1

Class instructors:

Dr inż. Szymon Dawczyński

Dr hab. inż. Marta Kałuża

Element of course groups in various terms:

Course group description	First term	Last term
missing group description in English (BudAB-S1-2019-sem3)	2020/2021-Z	

Course credits in various terms:

<without a specific program>			
Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	2	2020/2021-Z	