# Design of Structures Projectwork - BMEEODHAS41

## I. Subject Specification

1. Basic Data

1.1 Title

Design of Structures Projectwork

1.2 Code

BMEEODHAS41

1.3 Type

Module with associated contact hours

1.4 Contact hours

| Type | Hours/week / (days) |
|---|---|
| Consultation | 2 |

1.5 Evaluation

Midterm grade

1.6 Credits

6

1.7 Coordinator

| | |
|---|---|
| name | Dr. habil. Stocker György |
| academic rank | Associate professor |
| email | stocker.gyorgy@emk.bme.hu |

1.8 Department

Dean's Office

1.9 Website

https://epito.bme.hu/BMEEODHAS41
https://fiek2.mywire.org/course/view.php?id=422

1.10 Language of instruction

hungarian and english

1.11 Curriculum requirements

Compulsory in the Specialization in Structural Engineering (BSc) programme

1.12 Prerequisites

Strong prerequisites:

- Steel and Composite Structures (BMEEOHSAS47)
- RC and Masonry Structures (BMEEOHSAS42)

Weak prerequisites:

- Foundation Engineering (BMEEOGMAT45)

Recommended prerequisites:

- Structural Analysis II. (BMEEOTMAS42)
- Building Construction II. (BMEEOEMAS43)

1.13 Effective date

2 February 2022

2. Objectives and learning outcomes

2.1 Objectives

The aim of the course is to provide a comprehensive complex design approach through an individual design task to obtain a basic design experience in all three areas (building construction, structural and geotechnical) prior to specialization.

2.2 Learning outcomes

Upon successful completion of this subject, the student:

A. Knowledge

1. Knows the engineering connections, main elements and rules of building construction design.
2. Knows the formal and substantive requirements of different architectural plan documents.
3. Knows the building energy principles required for designing building constructions.
4. Know the determination of loads and the Standard requirements for compiling the load combinations required for various purposes.
5. Knows the content and form requirements of structural construction plans.
6. Knows the production method of a structural calculation and documentation.
7. Knows the basic rules of planning and evaluation of soil tests and their points of attachment to structural design.
8. Is familiar with the main elements, rules of flat foundation design and their relationship to structural design.

B. Skills

1. Can on a basic level, interpret, understand a small scale building construction task, manage the different tasks of engineering design, and recognize the engineering needs of related tasks, and handle complex technical problems.
2. Can apply the previously acquired knowledge in a specific task.
3. Is capable of solving the small-scale building construction planning task through independent decisions.
4. Can compile complex design documentation together with attachments in orderly form.
5. Can determine the static framework and determine the stresses and deformations of the loads.
6. Can calculate the resistances and limit values defined by the Standards, thus demonstrating the compliance of the structural element in the knowledge of the effects and resistances.
7. Can prepare construction drawings, based on which - assuming a well prepared constructor – structure could be carried out.
8. Can document static calculations to be orderly, trackable, and understandable.
9. Is able to interpret the soil analysis report needed to prepare a small scale structural design task to choose out and apply the relevant parts of the building construction.
10. Using building construction and structural design criteria and demands, student can perform geotechnical planning steps for a simpler flat foundation.

C. Attitudes

1. During the course consultations, student continuously cooperates with the instructor.
2. Expands one's knowledge and professional vocabulary through continuous knowledge gaining.
3. Continually learns about the relevant Standards, regulations, laws, planning recommendations.
4. Aims for accurate and error-free task solving.
5. Is open to the use of information technology tools.
6. Maintains the principle of economy and environmental awareness in technical design.

D. Autonomy and Responsibility

1. Independently carries out the planning and solving of technical problems through planning.
2. Collaborates with the consultant to solve the problem.
3. Accepts openly critical comments.
4. In thinking, uses the systemic approach.

2.3 Methods

Task has to be solved with the knowledge that has been learned from objects in previous years and through consultations.

2.4 Course outline

**Building construction**

During the course tasks are the followings: concept design of a domestic family house, building permission plan, construction plan, with building construction detail drawings, simplified energy calculation.

**Structural Engineering**

Static dimensioning and control of the design elements of the family house and the preparation of the structural construction plan of the selected elements.

Among others:

- Prefabricated and / or monolithic reinforced concrete slabs;
- RC. beams, columns;
- Timber roofing elements and their connections;
- Steel structures and connections;
- Composite structures - sizing and preparing plans;
- Checking the load bearing capacity of a masonry structure

**Geotechnics**

During the semester, based on the soil exploration results provided by the consultant, a simplified soil analysis report is required for further planning of a family house. To fit the architectural plans, prepare the building's foundation draft plan, and then a foundation construction plan together with the necessary geotechnical

calculations.
Due to the nature of the subject, the program is for informational purposes only.
The above programme is tentative and subject to changes due to calendar variations and other reasons specific to the actual semester. Consult the effective detailed course schedule of the course on the subject website.

2.5 Study materials

a) Notes / books:

1. Ernst and Peter Neufert: Architect' Data, 2012
2. Stephen Emmitt, Christopher A. Gorse: Barry's introduction to construction of buildings, 2010
3. Barry's Advanced Construction of Buildings, 2006
4. Roy Chudley, Roger Greeno: Construction Technology, 1999
5. Roy Chudley, Roger Greeno: Building Construction Handbook, 2016
6. Guidelines during consultation
7. Reischl A.: Lakóépületek tervezése (HUN)
8. Gádoros L.: A lakás berendezése és méretezése (HUN)
9. Kapsza M.: Otthontervezési tanácsadó (HUN)
10. Családi házak szerkezeti csomópontjai (tervezési segédlet) (HUN)

b) Online materials:

1. Individual design tasks sheets
2. Sample plan documents
3. Sample calculations
4. Guides (e.g. energetic calculation guide - ENG)
5. Notes

c) Related legislation:

1. OTÉK (Hungarian Urban and Building Requirements)
2. OTSZ (Hungarian Fire Regulations)
3. Hungarian Energy Regulation

2.6 Other information

None.

2.7 Consultation

The instructors are available for consultation during classes. Further special appointments can be requested via e-mail: ‘consultant’@epito.bme.hu

This Subject Datasheet is valid for:

2023/2024 semester I

## II. Subject requirements

Assessment and evaluation of the learning outcomes

3.1 General rules

The assessment of the learning outcomes specified in clause 2.2. above and the evaluation of student performance occurs via homework assignments and class work.

3.2 Assessment methods

| Evaluation form | Abbrev. | Assessed learning outcomes |
|---|---|---|
| Plan document - building construction | HA1 | A.1-A.4; B.1-B.4; C.1-C.6; D.1-D.4 |
| Plan document - structural engineering | HA2 | A.4-A.6; B.5-B.8; C.1-C.6; D.1-D.4 |
| Plan document - geotechnical engineering | HA3 | A.7-A.8; B.9-B.10; C.1-C.6; D.1-D.4 |

The dates of deadlines of assignments/homework can be found in the detailed course schedule on the subject's website.

3.3 Evaluation system

| Abbreviation | Score |
|---|---|
| HA1 | 1/3 |
| HA2 | 1/3 |
| HA3 | 1/3 |
| **Total achievable during the semester** | **1** |
| **Sum** | **1 (100%)** |

3.4 Requirements and validity of signature

No signature can be obtained from the object.

3.5 Grading system

Successful completion of the course requires that the student obtain the signatures certifying continuous progress by the deadlines specified in the Detailed Semester Schedule, which is confirmed by the signature of each Consultant recorded in the Consultation Sheet.
Prior to each sub-deadline, the student must present the part of the plans and documentations relating to the sub-deadline to each Consultant in a personal consultation. At the pre-submission consultation, the Consultant will record the fact of "submission" in the Consultation Sheet after checking the content and form of the assignment. Only in this possession can be the individual subtasks be submitted.
The condition for successful completion is that the student achieves a sufficient result in each discipline (HW1, HW2, HW3) separately. Failure to meet any part of the project and sub-deadline will result in non-compliance with the semester.
The final grade is given by the weighted, rounded average of the grades obtained for the plans of the different areas according to point 3.3.

3.6 Retake and repeat

1) Submission of the design plan documentation is possible by 12:00 on the last day of semester period.
2) Late submission of the design plan documentation is possible by 12:00 on the last day of supplementary week. Additional fee is required in case of late submission.

3.7 Estimated workload

| **Activity** | **Hours/semester** |
|---|---|
| contact hours | 28 |
| preparation of the plan documents | 152 |
| **Sum** | **180** |

3.8 Effective date

2 February 2022

This Subject Datasheet is valid for:

2023/2024 semester I