

# KLAIPĖDA STATE UNIVERSITY OF APPLIED SCIENCES

## Faculty of Technologies

**STUDY PROGRAMME:** CONSTRUCTION  
**NAME OF THE SUBJECT:** TECHNOLOGIES AND MANAGEMENT OF BUILDING MODERNISATION  
**CODE OF THE SUBJECT:** TF-S-2-1631

| Group of the subject* | Type of the subject** | Form of studies        | Structure*** |    |    |    | Total number of hours | Number of credits |
|-----------------------|-----------------------|------------------------|--------------|----|----|----|-----------------------|-------------------|
|                       |                       |                        | T            | P  | C  | I  |                       |                   |
| GS                    | P                     | Full-time studies (FT) | 18           | 18 | 4  | 40 | 80                    | 3E                |
|                       |                       | Part-time studies (PT) | 10           | 8  | 22 | 40 |                       |                   |

\*Group of the subject: GS – general study subjects; SF – subjects of the study field.

\*\*Type of the subject: C – compulsory subject; A – optional subject (alternative), FE – freely elective subject.

\*\*\*Structure: T – theory; P – seminars, workshops, laboratory works; C – consultations; I – individual work.

**NECESSARY PREPARATION FOR THE STUDIES OF THE SUBJECT:** physics; building materials; building constructions; engineering systems of buildings; technology of construction works; construction economics.

### Annotation

The aim of the subject is to provide knowledge about the criteria of physical and moral depreciation of a building, defects occurring during its exploitation and causes of their occurrence, as well as modernisation methods. The subject analyses a concept of the advanced technology of building modernisation, its development stages, tasks, areas of the primary activities, complexity of work organisation and perspectives for renovation and repair of buildings. It also examines criteria of physical and moral depreciation of buildings; the most important damages of buildings and their constructions occurring during their exploitation, as well as causes of their occurrence. Students will be taught how to select and apply modernisation technologies, calculate the scope of works, assess quality of works, organise works and establish safe methods of work. Duration of the subject is one semester.

**The connection of results of the study programme with results of the study subject and study methods, as well as evaluation methods of the learning achievements**

| Results of the study programme  | Results of the study subject  | Study methods  | Evaluation methods of the learning achievements  |
|---|---|--|--|
| A.3. A student knows product properties of construction materials, fields of use and applies them in the building design and the construction process.  | A.3.1. A student knows materials, products and their properties used for the performance of building modernisation works.                           | Explanation of theoretical material, discussions, practical works and study of the educational material in “Moodle” virtual learning environment.                        | Test (1, 2), preparation and defence of practical work (2, 3, 4), as well as examination.    |
| D.1. A student is able to prepare structural part of the project, to select optimal methods of construction, taking into account the construction environment, aesthetical and architectural aspects, economic factors and estimated exploitation conditions. | D.1.1. A student is able to assess defects of the buildings and to estimate technologies of building modernisation.                                 | Explanation of theoretical material, practical works and study of the educational material in “Moodle” virtual learning environment.                                     | Test (1, 2), preparation and defence of practical work (2, 3, 4), as well as examination.    |
| D.2. A student applied international, European and Lithuanian normative technical construction documents and standards in the building design and construction process.   | D.2.1. A student applied normative technical construction documents, regulating works of building modernisation.                                    | Explanation of theoretical material, discussions, analysis of documents, practical works and study of the educational material in “Moodle” virtual learning environment. | Test (1, 2), preparation and defence of practical work (1, 2, 3, 4), as well as examination. |
| D.3. A student plans and organises the construction process, ensuring high quality performance of works and safety of human and environment.  | D.3.1. A student concludes schemes, related to performance of works of building modernisation by applying methods of quality control and safe work. | Explanation of theoretical material, discussions, analysis of documents, group work, practical work and study of the educational material in “Moodle” virtual            | Test (1, 2), preparation and defence of practical work (2, 3, 4), as well as examination.    |

|  |   |   |  |
|--|---|---|--|
|  |   | learning environment.   |  |
| D.4. A student uses information technologies, basic software, applies software for building design and preparation of estimated documentation. | D.4.1. A student is able to use information technologies and apply software during the conclusion of technological work cards by calculating the necessary resources and concluding schedules of works. | Explanation of theoretical material, discussions, analysis of documents, group work, practical work and study of the educational material in “Moodle” virtual learning environment. | Preparation and defence of practical work (2, 3, 4), as well as examination. |
| E.2. A student is able to convey information, design ideas and their solution methods for the audience of specialists and non-specialists      | E.2.1. A student is able to prepare written papers and to discuss   | Analysis of literature, situation analysis, individual and group work, as well as discussion  | Defence of practical work (1, 2, 3, 4).                                      |

### Contents and scope of the subject

| Topic name and content description   | Number of the contact hours, FT form |           |          | Number of the contact hours, PT form |          |           | I         | Total number of hours |
|--|--------------------------------------|-----------|----------|--------------------------------------|----------|-----------|-----------|-----------------------|
|  |                                      |           |          |                                      |          |           |           |                       |
|  | T                                    | P         | C        | T                                    | P        | C         |           |                       |
| <b>1. General knowledge about building modernisation:</b> Aims and objectives of building modernisation. Reasons for depreciation of buildings. Primary terms and definitions. Normative legislation, regulating building modernisation.   | 1                                    | -         | -        | 1                                    | -        | -         | 3         | 4                     |
| <b>2. Technical condition of buildings and its assessment:</b> Organisation of maintenance works of the building. Inspection of buildings and their structures by applying geographic information systems.<br><b>Practical work No 1.</b> Conclusion of technical passport by using “Bentley Microstation” software.   | 2                                    | 3         | -        | 1                                    | 1        | 3         | 3         | 8                     |
| <b>3. Foundation insulation.</b> Insulation methods. Protection of underground structures against dampening. Recovery of waterproofing of foundation.<br><b>Practical work No 2.</b> Foundation insulation of <i>n</i> building.   | 2                                    | 4         | 1        | 1                                    | 2        | 4         | 4         | 11                    |
| <b>4. Insulation of enclosures:</b> Insulation of enclosures from the outside, inside and by filling the existing cavities.<br><b>Practical work No 3.</b> Insulation of external walls of <i>n</i> building   | 2                                    | 4         | 1        | 1                                    | 2        | 4         | 4         | 11                    |
| <b>5. Repair and insulation of the roofs:</b> Repair and insulation of flat roofs. Repair and insulation of pitched roofs. Monitoring of the building roofs by using “Bentley Microstation” software.<br><b>Practical work No 4.</b> Monitoring of the building roofs by using “Bentley Microstation” software and preparation of technology for the insulation of the building roofs. | 2                                    | 5         | -        | 2                                    | 2        | 3         | 4         | 11                    |
| <b>Test</b> (1, 2, 3, 4 topics).   | -                                    | 2         | -        | -                                    | 1        | 1         | 1         | 3                     |
| <b>6. Planning of the building modernisation.</b> Selection of strategy for the performance of building renovation. Planning of building renovation. Preparation of a task and requirements for design and installation by using “Bentley Microstation” software. Preparation of documentation, related to the procurement of services of general contractor.                          | 4                                    | -         | -        | 2                                    | -        | 2         | 6         | 10                    |
| <b>7. Internal and external finishing works of the building:</b> Defects of the building façades and reasons for their occurrence. Renovation of the building façades and internal finish. Monitoring of the building façades by using “Bentley Microstation” software.  | 2                                    | -         | -        | 1                                    | -        | 1         | 4         | 6                     |
| <b>8. Modernisation of the building engineering systems.</b> Preparation of a task and requirements for design and installation by using “Bentley Microstation” software.  | 3                                    | -         | -        | 1                                    | -        | 2         | 3         | 6                     |
| <b>Preparation for the examination</b>   | -                                    | -         | 2        | -                                    | -        | 2         | 6         | 8                     |
| <b>Total number of hours</b>   | <b>18</b>                            | <b>18</b> | <b>4</b> | <b>10</b>                            | <b>8</b> | <b>22</b> | <b>40</b> | <b>80</b>             |

### Assessment system of results of the subject studies

#### Assessment criteria of results of the study subject

Application of construction materials and products in technologies of building modernisation.

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| A student applies normative technical construction documents and standards, regulating building modernisation.                                       |
| Analysis of construction technologies, taking into account situations of application.  |
| A student is able to assess defects of the buildings and to determine proper technologies of building modernisation.                                 |
| A student calculates the scope of works, labour costs and the need for materials and mechanisms, related to building modernisation.                  |
| A student is able to select mechanisms, machinery, tools and inventory for the performance of works, related to building modernisation.              |
| A student is able to apply requirements for quality control of works and occupational safety during the performance of building modernisation works. |
| A student applies software.  |
| A student identifies problems and provides solutions.  |

#### Procedure of evaluation

A ten-point criterial grading scale and system of an individual cumulated grading are applied.

$$IKV = \sum_{i=1}^n X_i \times k_i,$$

Where:

**n** – number of interim assessments;

**X<sub>i</sub>** – evaluations for interim assessments and examination;

**k<sub>i</sub>** – weighted coefficients of interim assessments and examination.

$$IKV = X_1 \cdot 0.2 + X_2 \cdot 0.4 + X_3 \cdot 0.4$$

**X<sub>1</sub>** – grading of a test,

**X<sub>2</sub>** – grading average of 4 practical works,

**X<sub>3</sub>** – grading of examination.

#### Recommended literature and other information sources

| Primary literature and information sources    |   |   |                                |
|---|---|---|--------------------------------|
| No  | Literature and information sources  | Number of copies                              |                                |
|   |   | At the library of the Faculty of Technologies | At other libraries of the city |
| 1.  | GAJAUSKAS J. (2006). <i>Statybos inžinieriaus žinynas</i> . Technika, Vilnius.  | 4   | -                              |
| 2.  | Lietuvos statybos inžinierių sąjunga. (2009). <i>Pastatų konstruktorius ir statybininko žinynas</i> . Naujasis lankas, Kaunas.  | 5   | -                              |
| 3.  | VENSKEVIČIUS V., ŽILINSKAS R. (2000). <i>Statinių rekonstrukcija ir remontas</i> . Technika, Vilnius.   | 1   | -                              |
| 4.  | ČERNIUS M. ir kt. (2008). <i>Pastato apdaila. Pastato šiltinimas ir tinkavimas. Apdaila plytelėmis ir apdailos elementų montavimas</i> . Mintis, Vilnius.   | 5   | -                              |
| Additional literature and information sources |   |   |                                |
| No  | Literature and information sources  |   |                                |
| 1   | ADOMAVIČIŪTĖ L. (2008). Pastatų remonto darbų technologija. Metodinė medžiaga.. <a href="http://moodle.kvk.lt">http://moodle.kvk.lt</a>   |   |                                |
| 2   | STR 01.12.07:2004 <i>Statinių techninės priežiūros taisyklės, kvalifikaciniai reikalavimai statinių techniniams prižiūrėtojams, statinių techninės priežiūros dokumentų formos bei jų pildymo ir saugojimo tvarkos aprašas</i> Aplinkos ministerija, Vilnius. Žin., 2004, Nr.98-3658. |   |                                |
| 3   | STR 2.01.10:2007 <i>Išorinės tinkuojamos sudėtinės termoizoliacinės sistemos</i> . Aplinkos ministerija, Vilnius. Žin., 2007, Nr.43-1651.   |   |                                |
| 4.  | <i>Bendrieji statybos darbai</i> . ST121895674.03:2005 (2005). Lietuvos statybininkų asociacija, Vilnius.   |   |                                |
| 5.  | JOHN WILEY & SONS LTD (2012). <i>Construction Innovation and Process Improvement</i> : Chicester, United Kingdom  |   |                                |
| 6.  | Edited by Ibo Österreichisches Institut Fur Baubiologie Und –Okologie (2016). <i>Details for Passive Houses Renovation: A Catalogue of Ecologically Rated Constructions for Renovation</i> : Birkhauser.  |   |                                |
| 7.  | Mann, P. A. (2014). <i>MicroStation Training Manual 2D Level 1: mokomoji knyga, elektroninis išteklis</i> .   |   |                                |
| 8.  | Krishnan G.V.; Taylor J. (2016) <i>Harnessing MicroStation: mokomoji knyga, elektroninis išteklis</i> .   |   |                                |

Description of the subject was prepared by:

|            |             |                                     |
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*(Position)*

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