



# Latvia University of Life Sciences and Technologies

## Doctoral School

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### Doctoral Study Programme

### CIVIL ENGINEERING

General information about the study programme

Educational Classification Code of the Republic of Latvia – 51582

The programme has been accredited till October, 27, 2028

Academic Adviser of the Programme: **Lilita Ozola**, Dr. sc. ing., Professor

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Duration of doctoral studies: full-time – 3 years

The awarded degree: Doctor of Science (Ph.D.) in Engineering Science and Technology

**The admission rules:** Persons who have obtained a master's degree or an equivalent higher education degree in Civil Engineering are accepted. If the master's degree is obtained in another branch of engineering sciences, an entrance examination must be passed in the chosen sub-discipline of civil engineering science. Applicants for doctoral studies holding previous degree documents awarded by foreign universities are required for recognition of foreign qualification by Academic Information Centre (AIC) of Latvia. Foreign applicants need English language skills of at least B2 level.

#### Annotation of the programme

Doctoral study programme is based on the Law on Institutions of Higher Education of the Republic of Latvia and Law on Scientific Activity, Cabinet Regulations № 1001 “Regulation on the procedure and criteria of promotion”, as well as the advice of accreditation experts have also been considered. The extent and structure of the programme correspond to the Guidelines for implementation of doctoral study programmes at LBTU (approved by decision Num 3.2.-12.2/14 of Science Council in September 27, 2023).

#### Aim of the programme

To create appropriate preconditions and, as a result of the implementation of the program, to prepare a generation of young scientists corresponding to an international level for research and academic work in civil engineering field, as well as for work in state and private institutions at a high level of professionalism with a clear, targeted development perspective.

#### Outcomes to be achieved

**Knowledge.** After successfully completing the study program, the young scientist is familiar with scientific theories and insights in the chosen sub-discipline of civil engineering, knows modern research methods, as well as knows special terminology in English and/or German.

#### Skills.

The young scientist is able to:

- independently assess the topicality and importance of the problem in the industry, to understand and evaluate its scientific significance, formulate research goals and tasks, choose appropriate research methods;

- plan and carry out both experimental and analytical studies, collect results, critically evaluate them and systematize the obtained information using appropriate data processing methods;
- prepare internationally cited publications;
- to communicate about his/her field of scientific activity and the problems of the civil engineering industry in circles of scientists and industry professionals both in Latvia and in foreign forums;
- independently raise his/her scientific qualification, implement research and/or development projects in companies and/or state structures.

Competences. The young scientist is able to formulate and analyze in detail the problems related to the scientific and professional activities in the relevant sub-discipline of civil engineering by performing a critical analysis of the available information. Able to integrate insights from other fields of science, which contribute to the creation of new knowledge and technologies.

### Research directions

The study directions currently developed by the PhD study program “Civil Engineering” of the Faculty of Environment and Civil Engineering are in accordance with the following sub-branches of the civil and transport engineering science defined by the Cabinet of Ministers Regulations Number 595 of the Republic of Latvia:

- Construction Materials and Technologies
- Structural Analysis
- Structural Engineering
- Geodesy and Geoinformatics
- Engineering Systems of Heat, Gas and Water Supply.

#### Study plan of the doctoral study programme „Civil Engineering” (IKK 51582)

| Study Course   | Assessment Mode       | Amount, KP<br>(1 KP= 1 ECTS) |
|--|-----------------------|------------------------------|
| <b>1. Theoretical Study Courses</b>  |                       | <b>45</b>                    |
| English for Research Professionals (ValoD001)/ German for Research Professionals (ValoD002) (Fachsprache Deutsch fuer Forschung) | Promotion Examination | 6                            |
| Scientific Research Methodology (CitiD016)   | Examination           | 6                            |
| Multivariate Data Analysis I (MateD005)  | Examination           | 3                            |
| Multivariate Data Analysis II (MateD001)   | Examination           | 3                            |
| Research Planning and Data Analysis (BūvZD010)   | Credit Test           | 3                            |
| Sub-Branch Course of Civil and transport engineering sciences*   | Promotion Examination | 12                           |
| Research Direction Course**  | Promotion Examination | 12                           |

| Study Course   | Assessment Mode | Amount, KP<br>(1 KP=<br>=1 ECTS) |
|--|-----------------|----------------------------------|
| <b>2. Scientific work</b>  |                 | <b>135</b>                       |
| Preparation of Scientific Papers (CitiD001)  | Credit Test     | 4                                |
| Latvian Language I (Valo1053)  | Credit Test     | 3                                |
| Research work including completion of doctoral thesis  | Regular reports | 68                               |
| Presentation of research results   | Certificates    | 25                               |
| Publication of research results (including publications cited by SCOPUS and/or Web of Science) | Publications    | 35                               |
| <b>Total</b>   |                 | <b>180</b>                       |

**Developed sub-branch courses in Civil and transport engineering:**

|          |   |       |
|----------|---|-------|
| BūvZD018 | Construction Materials and Technologies | 12 CP |
| BūvZD016 | Structural analysis                     | 12 CP |
| BūvZD008 | Structural Engineering                  | 12 CP |
| BūvZD012 | Geodesy and Geoinformatics              | 12 CP |
| BūvZD017 | Heat, Gas and Water Engineering Systems | 12 CP |

**\*\* Developed special courses of the research direction:**

|          |  |       |
|----------|--|-------|
| BūvZD013 | Technology of Heat and Acoustic Materials and Products | 12 CP |
| BūvZD009 | Cement Composites and Composite Structures             | 12 CP |
| BūvZD014 | Timber Engineering                                     | 12 CP |
| BūvZD015 | Climate control systems and their operation            | 12 CP |
| BūvZD011 | Precise Geometrical Levelling                          | 12 CP |
| BūvZD020 | Real Property Management                               | 12 CP |

**Study Plan of the PhD Programme Civil Engineering (Full-time studies in English)**

| No.  | Course Code (LBTU IS) | Study Course  | Extent, ECTS | 1st Year    |             | 2nd Year    |             | 3rd Year    |             |
|--|-----------------------|---|--------------|-------------|-------------|-------------|-------------|-------------|-------------|
|  |                       |   |              | Autumn Sem. | Spring Sem. | Autumn Sem. | Spring Sem. | Autumn Sem. | Spring Sem. |
| <b>A – Compulsory courses</b>                                |                       |   | <b>21</b>    | <b>15</b>   | <b>6</b>    |             |             |             |             |
| 1  | ValoD001/<br>ValoD002 | English for Research Professionals/ German for Research Professionals | 6            | 6 PE        |             |             |             |             |             |
| 2  | CitiD016              | Scientific Research Methodology                                       | 6            | 6 E         |             |             |             |             |             |
| 3  | MateD005              | Multivariate Data Analysis I  | 3            | 3 E         |             |             |             |             |             |
| 4  | MateD001              | Multivariate Data Analysis II   | 3            |             | 3 E         |             |             |             |             |
| 5  | BūvZD010              | Research Planning and Data Analysis                                   | 3            |             | 3 CT        |             |             |             |             |
| <b>B – Restricted sub-branch elective courses</b>            |                       |   | <b>12</b>    |             |             |             | <b>12</b>   |             |             |
| 6  | BūvZD018              | Construction Materials and Technologies                               | 12           |             |             |             | 12 PE       |             |             |
| 7  | BūvZD016              | Structural Analysis   | 12           |             |             |             | 12 PE       |             |             |
| 10   | BūvZD008              | Structural Engineering  | 12           |             |             |             | 12 PE       |             |             |
| 11   | BūvZD012              | Geodesy and Geoinformatics  | 12           |             |             |             | 12 PE       |             |             |
| 12   | BūvZD017              | Engineering Systems of Heat, Gas and Water Supply                     | 12           |             |             |             | 12 PE       |             |             |
| <b>B – Restricted elective courses of research direction</b> |                       |   | <b>12</b>    |             |             |             |             |             | <b>12</b>   |
| 13   | BūvZD013              | Technology of Heat Insulation and Acoustic Materials and Products     | 12           |             |             |             |             |             | 12 PE       |
| 14   | BūvZD009              | Cement Composites and Composite Structures                            | 12           |             |             |             |             |             | 12 PE       |
| 15   | BūvZD014              | Timber Engineering  | 12           |             |             |             |             |             | 12 PE       |
| 16   | BūvZD015              | Climate Control Systems and Their Operation                           | 12           |             |             |             |             |             | 12 PE       |
| 17   | BūvZD011              | Precise Geometrical Levelling   | 12           |             |             |             |             |             | 12 PE       |
| 18   | BūvZD020              | Real Property Management  | 12           |             |             |             |             |             | 12 PE       |
| <b>Scientific research</b>                                   |                       |   | <b>135</b>   | <b>15</b>   | <b>24</b>   | <b>30</b>   | <b>18</b>   | <b>30</b>   | <b>18</b>   |
| 19   | CitiB003              | Preparation of Scientific Papers                                      | 4 CT         |             | 4           |             |             |             |             |
| 20   | Valo1053              | Latvian Language I  | 3 CT         |             | 3           |             |             |             |             |
| 21   | *                     | Research work   | 48           | 15          | 9           | 18          | 4           | 2           |             |
| 22   | **                    | Presentation of research results                                      | 25           |             | 4           | 5           | 6           | 5           | 5           |
| 23   | ***                   | Publications of research results                                      | 35           |             | 4           | 7           | 8           | 10          | 6           |
| 24   |                       | Completion of doctoral thesis   | 20           |             |             |             |             | 13          | 7           |
|  |                       |   | <b>180</b>   | <b>30</b>   | <b>30</b>   | <b>30</b>   | <b>30</b>   | <b>30</b>   | <b>30</b>   |

I - Credit Test; E – Examination, PE - Promotion Examination.

\* Research is the independent work of a doctoral student; the student identifies sources of scientific information, conducts research and analysis of selected information, compiles a review, performs planning of experiments, chooses the most suitable research methods, performs data processing and analysis of the obtained results, gradually creates a doctoral thesis under the supervision, discussion and regular assessment of progress in the related department (semi-annual report in the department, annual report in the Faculty Council)..

\*\* Presentation of research results includes preparation of research results for presentation at local and international scientific conferences, seminars, symposia. Requirements for obtaining credit points - in accordance with the "Guidelines for Implementation of Doctoral Study Programme "Civil Engineering".

\*\*\* The student prepares scientific publications on the results of his research, which were obtained by completing the tasks set in the doctoral thesis, in order to achieve the set goal. Prepared articles are published in scientific journals and/or proceedings of scientific conferences. The student prepares and submits a patent application for the invention to the Patent Office of the Republic of Latvia. Requirements for obtaining credit points - in accordance with the "Guidelines for Implementation of Doctoral Study Programme "Civil Engineering".

## **GUIDELINES FOR IMPLEMENTATION OF DOCTORAL STUDY PROGRAMME "CIVIL ENGINEERING"**

The conditions for the implementation (or execution) of the doctoral study program "Civil Engineering" have been developed in accordance with the LBTU Doctoral Studies Regulations (approved by Senate decision No. 11-119 on June 14, 2023) and based on the LBTU Doctoral study program implementation guidelines (approved by the LBTU Science Council decision no. 3.2.-12.2/14 on September 27, 2023).

1. The total amount of the doctoral study program is **180 KP (1 KP = 1 ECTS)** including:
  - theoretical studies      **45 KP**
  - research work            **135 KP.**
  
2. **Theoretical studies** in the doctoral study program "Civil Engineering ".
 

|  |              |
|--|--------------|
| The total amount of  | <b>45 KP</b> |
| • sub-branch of civil and transport engineering science group (including promotion examination), | 12 KP        |
| • elective course of research direction (including promotion examination),                       | 12 KP        |
| • English or German for Research Professionals (including promotion examination)                 | 6 KP         |
| • courses of research methodology and data analysis  | 15 KP        |
  
3. **Research work\*** and amount of credits:
 

|   |                                |
|---|--------------------------------|
| • Research:   | <b>71 KP</b>                   |
| Investigations including data processing  | 36 KP                          |
| Review of literature (20-25 articles valued by 2 KP)  | 15 KP                          |
| Completion of doctoral thesis   | 20 KP                          |
| • Presentation of research results.   | <b>The total amount: 25 KP</b> |
| Value of one oral presentation or poster presentation at local or international scientific conference, meeting/ workshop/ congress/ symposium | 3-5 KP                         |
| Value of one oral presentation or poster presentation at local or international forum of practitioners  | 2-3 KP                         |

- Publications of research results (including course *Preparation of Scientific Papers*). **39 KP**  
The total amount:  
Value of one publication in scientific journal cited by *Web of Science Core Collection* and/or *Scopus*; 6-12 KP  
Value of one publication in proceedings of international scientific conference cited by *Web of Science Core Collection*, *Conference Proceedings Citation Index* and/or *SCOPUS*; 3-5 KP  
approved patent application in Latvia (or foreign country) 3-5 KP

\* The scientific work also includes the doctoral student's international experience event(s) (ERASMUS activities, international projects, etc.) at least once during the study period with the aim of promoting the doctoral student's involvement in international cooperation, in order to have the opportunity to get acquainted with the experience of scientific research in the development of related topics in foreign universities and/or in other scientific institutions, as well as to establish contacts with doctoral students and lecturers of foreign universities who might be interested in solving compelling research topics and discussing results, reviewing articles and dissertations and/or developing collaborative projects.