

## **TRAINING PROGRAM IN DISCIPLINE: Civil engineering and Transport**

### 1. Basic information

*Domain: Engineering and Technology*

*Discipline: Civil Engineering and Transport*

*Degree awarded: PhD in Civil Engineering and Transport*

### 2. Training demand

The knowledge-based society requires highly skilled workers in various branches of industry related to material engineering, construction design, building maintenance, sustainable development, high schools ranking among the top ones, higher education and research and development centres. According to thorough investigations civil and transport engineers are commonly those with least unemployment rate among engineers from various technical disciplines. This is a consequence of both theoretical and practical training which is implemented, and which is based on utmost scrutiny and high level analysis. Moreover, the research skills, trained in civil engineering and transport courses, lead to the habit of checking all details and foreseeing possible opportunities which is believed to be indispensable in a modern economy, which is based on innovation. With such a profile of research and related skills PhD in civil engineering and transport are valued as possible employees in areas that require comprehensive analytical skills. Last but not least there is some demand of employing new instructors and assistant professors at universities and colleges in Poland due to the fact of increasing generation gap that has been observed. Moreover, graduates with attitude towards interdisciplinary research will bring some new ideas and possible influence future research directions.

### 3. Detailed entry requirements

For PhD in civil engineering and transport there are eligible graduates of civil engineering, mechanics, materials engineering or other related courses. The candidates are advised to get in touch with possible future supervisor and tutors and start cooperation prior to the admission procedure. Future candidates are advised to investigate topics related to seminars held in the discipline of civil engineering and transport at the Lodz University of Technology as well as the formal and informal research requirements demanded by research groups. The choice of preferable research group prior to entrance examination is warmly advised since not all existing branches of civil engineering are present at LUT.

### 4. Teaching methods

Teaching methods vary from course to course reflecting the teaching attitude towards civil engineering and transport. These comprise, laboratory applying the up-to-date measuring techniques, presentations with details being presented on the board, seminars, projects and case study problem solving using modern software, development of numerical codes for solving various non-linear problems but also traditional board and chalk lectures are given. Very often a sort of mixed methods is employed. There are offered courses allowing for broadening of knowledge and developing skills from various fields of engineering: mechanics, materials

engineering, materials chemistry, steel and concrete reinforced structures, etc. Level of the courses is based on the profile of candidates and so are the methods which would be chosen through the course.

### 5. Graduate's profile

PhD graduate in civil engineering and transport knows and understands the worldwide scientific knowledge related to the area of PhD thesis and their implications for practical applications, especially in the other branches of engineering. The graduate can perform through analysis and synthesis of scientific results in order to identify and solve research task with introduction of innovative solutions and observations. PhD graduate is equipped with the broad knowledge in the field of civil engineering and transport concerning in particular the mechanics of microstructural materials, the multiphysics problems, thermo-mechanics, etc. One is able to recognize and analyse the problems, select and efficiently use the appropriate scientific tools. The graduate can plan her/his development and inspire others to participate in discussions, solving problems, also in international environment. The graduate is ready to start independent scientific research, undertake challenges both in science and society, putting emphasis on ethical aspects and social impact of undertaken tasks.

### 6. Training plan

<b>First year (Semester 1 and 2)</b>		
No.	Subcategory	Subject
1	E	Entrepreneurship
2	CC1	Physics of Building Materials I
3	CC2	Physics of Building Materials II
4	CC3	Reliability and Optimization in Civil Engineering I
5	CC4	Reliability and Optimization in Civil Engineering II
6	CC5	Advanced mechanics of soils I
7	CC6	Advanced mechanics of soils II
<b>Second year (Semester 3 and 4)</b>		
No.	Subcategory	Subject
1	CC7	Computational methods in non-linear solid mechanics I
2	CC8	Computational methods in non-linear solid mechanics II