

## PROGRAMME OF EDUCATION

FACULTY: Civil Engineering

MAIN FIELD OF STUDY: civil engineering

in area of technical science

EDUCATION LEVEL: ~~1st / 2nd~~ \* level, ~~licencjat / inżynier / magister~~ / magister inżynier (MSc) studies\*

FORM OF STUDIES: full-time / ~~part-time~~\*

PROFILE: general academic / ~~practical~~ \*

SPECIALIZATION\*: Civil Engineering

LANGUAGE OF STUDY: English

Content:

1. Assumed educational outcomes – appendix no 1.
2. Programme of studies – appendix no 2.

Faculty Council resolution no. 516/333/2012-2016 from 24.06.2015.

In effect since 01.10.2015

\*delete as applicable

## **I. EDUCATIONAL OUTCOMES**

### **for the field of study *civil engineering* 2<sup>nd</sup> level studies – general academic profile**

#### **Faculty of Civil Engineering Wroclaw University of Technology**

##### **1. The area descriptors taken into consideration in the description of the educational outcomes for the field of study**

In the description of the field of study *civil engineering* for the second level of study all educational outcomes from the description of educational outcomes for the area of technical sciences have been considered. The field of study *civil engineering* is uniquely matched to the area of education corresponding to technical sciences. The description of qualifications for the second level of studies includes outcomes for both study levels.

Description of the intended learning outcomes for the field of study *civil engineering* for the second level study of the general academic profile:

- a) takes into account all the learning outcomes in terms of knowledge, skills and social competences appropriate to the field of study, education level and profile, described in the learning outcomes for the area of technical sciences, to which it was assigned;
- b) also takes into account the full range of outcomes for the study of general academic profile, leading to the engineering competence.

A graduate of the second level of study must possess competences determined by educational outcomes listed below. However, it does not mean that all listed outcomes must be fulfilled as a result of the realization of the second level study programme; some of them might be achieved during the first level studies, as well as – within a limited scope – as a result of non formal education.

## 2. Educational outcomes

### 2.1. General educational outcomes

After completing the second level study of general-academic profile at the field of study *civil engineering* a graduate according to acquired knowledge, skills and competences is prepared to be able to make decisions concerning the proper selection of building materials to be used, the design of building objects and construction undertakings. A graduate knows current trends in designing and realizing construction undertakings. He applies health and safety rules at work.

A graduate is able to design building objects, knows principles of structural mechanics, is able to formulate, create and then apply appropriate calculation models of complex engineering structures. He is able to make and read technical drawings, recognize cartographic and geodesic elaborations and also administer construction works. He is able to formulate and solve new engineering, technical and organizational problems related to civil engineering. A graduate make use of state of the art computer technologies supporting object design processes as well as construction undertakings. He is able to critically choose arguments supporting collective decisions regarding civil engineering tasks realization. A graduate is able to elaborate and alternatively publish reports regarding the development of works. He is able to work in a team and also supervise team work. He is responsible for work safety of a supervised team. He is aware of the necessity of increasing professional and personal competences. He follows the code of ethics. He knows and applies building law and regulations. He possesses language skills in the area of scientific disciplines and fields of study adequate to the studied discipline according to CEFR requirements for at least B2+ level. He is prepared to continue education at third level study. Graduates are prepared to solve complex project, organizational, technological problems, elaborate and realize research programmes, undertake actions on the international scale, participate in marketing and promotion of building products, continue education and participate in research and activities directly related to civil engineering and building manufacturing, continuously increase qualifications and complement knowledge and also manage big teams. Graduates have possibilities to start work in construction-project offices, contracting companies, research institutes and research and development centers and also institutions dealing with advisory and knowledge promotion in the area of civil engineering.

Moreover, graduates of particular specializations obtain additional, broadened competences resulting from educational outcomes described for given specializations:

**Civil Engineering** specialization run in English enables a graduate gain extended knowledge and skills in the area of design and construction of different building objects such as composite reinforced concrete and steel structures, building structures, urban engineering objects, roads and highways, bridges, railway engineering objects.

Moreover the graduate possesses extended knowledge of hydraulics and computer aided engineering. Every graduate possesses extended own knowledge of chosen objects within the wide range of elective modules.

## 2.2. Specific educational outcomes

### Description of symbols used in shortcuts :

**K2** – educational outcomes for the field of study

**W** –category of knowledge (W)

**U** – category of skills (U)

**K** (after the underscore) – category of personal and social competences (KPS)

**K2S** – educational outcomes related to the specialisation

**\_CEB\_** – reference to the specialisations respectively: Civil Engineering

**T2A\_** – educational outcomes in the area of technical sciences for the second level study

**InzA\_** – learning outcomes leading to the engineering competences for the first level qualifications – general academic profile

## DESCRIPTION OF THE EDUCATIONAL OUTCOMES

## REFERENCE TABLE FOR FIELD OF STUDY OUTCOMES TO OUTCOMES IN THE AREA OF TECHNICAL SCIENCES AND TO OUTCOMES LEADING TO THE ENGINEERING COMPETENCES

Educational outcomes for the field of study (K2_)	Description of the educational outcomes for the general academic profile. After completing the second level in the field of study <i>Civil Engineering</i> a graduate:	The reference to the educational outcomes in the area of technical sciences (T2A_)	The reference to the educational outcomes leading to the engineering competences (InzA_)
<b>KNOWLEDGE</b>			
K2_W01	possesses essential advanced knowledge in the area of chosen sections of mathematics and physics in the scope being the basis for the strength of materials, mechanics, including dynamics as well as the theory of structures.	T2A_W01	
K2_W02	possesses broadened knowledge of advanced problems related to the strength of materials and materials modelling	T2A_W01, T2A_W02, T2A_W04, T2A_W05	InzA_W05
K2_W03	possesses adequate, essential knowledge of theoretical basis of the finite element method and general principles of leading non linear calculations of engineering structures.	T2A_W01, T2A_W02, T2A_W04, T2A_W05, T2A_W07	InzA_W02, InzA_W05
K2_W04	knows sufficiently well the basis of continuum mechanics; knows principles of analysis of statistics problems, stability of complex rod structures as well as plates, discs, coatings and solid structures and also the dynamics of these structures characterized by many dynamic degrees of freedom i.e. discrete or discretized systems.	T2A_W01, T2A_W04	InzA_W05
K2_W05	possesses fundamental knowledge of theoretical basis of analysis and structure optimization as well as complex structural systems design	T2A_W01, T2A_W04, T2A_W07	InzA_W02, InzA_W05
K2_W06	knows standard, guidelines and regulations relevant to the building constructions design and their elements	T2A_W03, T2A_W04, T2A_W06	InzA_W01, InzA_W05
K2_W07	knows principles of analysis, construction and dimensioning of complex building construction: steel and reinforced concrete	T2A_W02, T2A_W03, T2A_W04, T2A_W05, T2A_W07	InzA_W02, InzA_W05

<b>K2_W08</b>	knows principles of foundations of complex building constructions	<b>T2A_W02, T2A_W03, T2A_W07</b>	<b>InzA_W02,InzA_W05</b>
<b>K2_W09</b>	knows classification and the range of applications of computer programs supporting the analysis and design of complex building constructions	<b>T2A_W02, T2A_W03, T2A_W04, T2A_W07</b>	<b>InzA_W02,InzA_W05</b>
<b>K2_W10</b>	knows currently used, modern building materials and basic components of technologies and their production	<b>T2A_W02, T2A_W03, T2A_W05, T2A_W06</b>	<b>InzA_W01,InzA_W05</b>
<b>K2_W11</b>	knows principles of creating quality management procedures of building undertakings; possesses knowledge of the way of complex building works realization as well as building objects; knows principles of normalization and standardization in civil engineering; possesses knowledge of cost effectiveness and realization time; knows programs useful in planning building undertakings	<b>T2A_W02, T2A_W06, T2A_W09</b>	<b>InzA_W01,InzA_W05, InzA_W04</b>
<b>K2_W12</b>	possesses grounded knowledge of running a business relevant to the construction industry; understands principles and basis of financial management of a company	<b>T2A_W09, T2A_W11</b>	<b>InzA_W04</b>
<b>K2_W13</b>	possesses knowledge of the influence of implementation of construction projects on environment	<b>T2A_W05, T2A_W06, T2A_W08</b>	<b>InzA_W01,InzA_W05, InzA_W03</b>
<b>K2_W14</b>	knows construction law and the Occupational Health and Safety Act	<b>T2A_W02, T2A_W08</b>	<b>InzA_W03</b>
<b>K2_W15</b>	knows patent law as well as intellectual property protection regulations and also code of ethics	<b>T2A_W10</b>	

	achieves outcomes in the category of KNOWLEDGE in one of the following specializations: <ul style="list-style-type: none"><li>• run in English language</li></ul> - Civil Engineering ( <b>K2S_CEB_W</b> ) (appendix 9)		
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<b>SKILLS</b>			
<b>K2_U01</b>	is able to use advanced specialized tools while searching internet databases and other resources for searching general information and related to widely considered civil engineering; is able to apply information technologies for communication and also is able to gain software supporting a designer job and also the person who organizes and administers building processes	<b>T2A_U01, T2A_U02, T2A_U03, T2A_U04, T2A_U06, T2A_U07</b>	
<b>K2_U02</b>	possesses language skills in fields of study related to the studied discipline according to CEFR requirements for at least B2+ level; possesses ability to communicate in foreign languages and knows elements of technical language in the area of civil engineering	<b>T2A_U01, T2A_U02, T2A_U03, T2A_U04, T2A_U06</b>	
<b>K2_U03</b>	is able to establish directions of further education and follow the process of self-learning	<b>T2A_U01, T2A_U05</b>	
<b>K2_U04</b>	is able to make a classification of simple and complex building structures	<b>T2_U07, T2A_U17, T2A_U18</b>	<b>InzA_U06, InzA_U07</b>
<b>K2_U05</b>	is able to make assessment and any kind of loads combinations acting on building objects together with their adequate combinations	<b>T2A_U10, T2A_U17</b>	<b>InzA_U03, InzA_U06</b>
<b>K2_U06</b>	is able to carry out classical statistical analysis and stability analysis of the regimes of rods (trusses, frames and ties) statically determinate and indeterminate and also surface structures (discs, plates, membranes, shells and solid elements) and also dynamic analysis of these types of structures consisting of multiple degrees of freedom as discrete or discretized systems	<b>T2A_U09, T2A_U17, T2A_U18, T2A_U19</b>	<b>InzA_U02, InzA_U06, InzA_U07, InzA_U08</b>
<b>K2_U07</b>	is able, in the environment of finite element method, correctly define a calculation model and carry out an advanced analysis in the linear range of complex engineering structures and is also able to apply the techniques of non linear calculations at elementary level	<b>T2A_U09, T2A_U10, T2A_U11, T2A_U12, T2A_U15, T2A_U18</b>	<b>InzA_U02, InzA_U03, InzA_U05, InzA_U07</b>

<b>K2_U08</b>	is able to solve complex concepts in the area of chosen sections of mathematics, being the basis of advanced construction analysis methods; is able to choose tools (analytical or numerical) to solve engineering problems; is able to use chosen computer programs supporting modelling and design processes in civil engineering	<b>T2A_U07, T2A_U08, T2A_U09, T2A_U10, T2A_U12, T2A_U15</b>	<b>InzA_U01, InzA_U02, InzA_U03, InzA_U05</b>
<b>K2_U09</b>	is able to critically assess the results of numerical analysis of complex engineering structures	<b>T2A_U08, T2A_U12, T2A_U16, T2A_U18</b>	<b>InzA_U01, InzA_U07</b>
<b>K2_U10</b>	is able to design complex foundations for building structures	<b>T2A_U09, T2A_U10, T2A_U12, T2A_U17, T2A_U18, T2A_U19</b>	<b>InzA_U02, InzA_U03, InzA_U06, InzA_U07, InzA_U08</b>
<b>K2_U11</b>	is able to model and design complicated components and complex steel and reinforced concrete structures	<b>T2A_U10, T2A_U12, T2A_U16, T2A_U17, T2A_U18, T2A_U19</b>	<b>InzA_U03, InzA_U06, InzA_U07, InzA_U08</b>
<b>K2_U12</b>	is able to prepare a graphics project documentation in the environment of chosen graphics programs	<b>T2A_U02, T2A_U04, T2A_U07, T2A_U19</b>	<b>InzA_U08</b>
<b>K2_U13</b>	is able to prepare the schedule of construction works and cost estimate of a construction undertaking and assess the efficiency of construction projects	<b>T2A_U02, T2A_U07, T2A_U10, T2A_U13, T2A_U14, T2A_K03</b>	<b>InzA_U03, InzA_U04</b>
<b>K2_U14</b>	is able to assess threats related to construction projects implementation and implement adequate safety principles, is able to develop norms and standards of work and quality management procedures	<b>T2A_U02, T2A_U10, T2A_U13, T2A_U14, T2A_K03</b>	<b>InzA_U03, InzA_U04</b>
<b>K2_U15</b>	is able to plan and carry out laboratory experiments leading to quality assessment of applied materials and also the assessment of the strength of building structure elements	<b>T2A_U08, T2A_U09, T2A_U11, T2A_U15, T2A_U16</b>	<b>InzA_U01, InzA_U02, InzA_U05</b>

<b>K2_U16</b>	is able to, according to scientific principles, using scientific know-how to formulate and develop entry works of a research type leading to solving engineering problems as well as technological and organizational, in civil engineering	<b>T2A_U01, T2A_U08, T2A_U15, T2A_U17, T2A_U18, T2A_U19</b>	<b>InzA_U01, InzA_U05, InzA_U06, InzA_U07, InzA_U08</b>
<b>K2_U17</b>	is able to plan, prepare and carry out research and prepare elaborations which prepare him/her to take up research work	<b>T2A_U01, T2A_U03, T2A_U05, T2A_U07, T2A_U08, T2A_U09, T2A_U10, T2A_U116, T2A_U17, T2A_U18</b>	<b>InzA_U01, InzA_U02, InzA_U03, InzA_U06, InzA_U07</b>
	achieves outcomes in the category of <b>SKILLS</b> in one of the following specializations: <ul style="list-style-type: none"> <li>• run in English language</li> </ul> - Civil Engineering ( <b>K2S_CEB_W</b> ) (appendix 9)		

<b>SOCIAL COMPETENCES</b>			
<b>K2_K01</b>	is aware of continuous increase of professional and personal competences; in formal and informal learning completes and broadens knowledge of modern processes and technologies related to civil engineering	<b>T2A_K01</b>	
<b>K2_K02</b>	realizes the significance and understands non-technical aspects and consequences of engineering activity and especially its influence on the natural environment and the related responsibility for decisions	<b>T2A_K02</b>	<b>InzA_K01</b>
<b>K2_K03</b>	is able to work independently and cooperate in a group on given tasks is responsible for safety of his own work as well as his team	<b>T2A_K03</b>	
<b>K2_K04</b>	Realizes the significance of professional behaviour and obey the code of ethics; identifies correctly and solve dilemmas related to the profession; is able to set priorities which help in implementing a task set by himself or others	<b>T2A_K04, T2A_K05</b>	
<b>K2_K05</b>	is able to think and act in a creative and entrepreneurial way	<b>T2A_K06</b>	<b>InzA_K02</b>
<b>K2_K06</b>	realizes the social role of technical university graduates and especially understands the need to formulate information and share it with society, e.g. through mass media, in relation to achievements in environmental engineering and other aspects of engineering activity; makes attempts at sharing such information and opinions in an understandable way, justifying different points of view.	<b>T2A_K07</b>	
<b>K2_K07</b>	is aware of the necessity of individual and team activities going far beyond an engineering activity	<b>T2A_K04, T2A_K05</b>	

**Appendix 9****Specific educational outcomes for *Civil Engineering* Specialization in the field of study *civil engineering***

Educational outcomes for specialization CEB (K2S_ CEB _)	Description of specialization educational outcomes for the general academic profile. After completing the second level study in the field of study <i>Civil Engineering</i> , specialization <i>Civil Engineering</i> a graduate gains additional educational outcomes:	The reference to the educational outcomes in the area of technical sciences (T2A_)	The reference to the educational outcomes leading to the engineering competences (InzA_)
<b>KNOWLEDGE</b>			
K2S_CEB_W16	possesses deepened and broadened knowledge of analysis, dimensioning and construction of complex structures in general construction: metal and reinforced concrete (objects)	T2A_W02, T2A_W03, T2A_W04, T2A_W05, T2A_W07	InzA_W02, InzA_W05
K2S_CEB_W17	possesses additional knowledge in the area of hydraulics	T2A_W02, T2A_W03, T2A_W04, T2A_W07	InzA_W02, InzA_W05
K2S_CEB_W18	possesses broadened knowledge of residential municipal structures	T2A_W02, T2A_W03, T2A_W04, T2A_W07	InzA_W02, InzA_W05
K2S_CEB_W19	possesses broadened knowledge of building roads, bridges and railways	T2A_W02, T2A_W03, T2A_W04, T2A_W07	InzA_W02, InzA_W05
K2S_CEB_W20	possesses developed knowledge of structures related to urban infrastructure	T2A_W02, T2A_W03, T2A_W04, T2A_W07	InzA_W02, InzA_W05
K2S_CEB_W21	possesses broadened knowledge of technologies of construction works	T2A_W02, T2A_W03, T2A_W04, T2A_W06	InzA_W01, InzA_W05
K2S_CEB_W22	possesses broadened knowledge of chosen elements of structures and building objects ( subjects from elective modules)	T2A_W02, T2A_W03, T2A_W04, T2A_W07	InzA_W02, InzA_W05

	<b>SKLLS</b>		
<b>K2S_CEB_U18</b>	possesses ability to analyse, dimension and construct complex building structures in general construction: steel and reinforced concrete (objects)	<b>T2A_U10, T2A_U12, T2A_U16, T2A_U17, T2A_U18, T2A_U19</b>	<b>InzA_U03, InzA_U06, InzA_U07, InzA_U08</b>
<b>K2S_CEB_U19</b>	is able to apply advanced computational techniques, including optimization ones, to model and calculate complex building structures	<b>T2A_U17, T2A_U18</b>	<b>InzA_U06, InzA_U07</b>
<b>K2S_CEB_U20</b>	is able to design chosen elements of geotechnical structures taking into consideration hydraulics problems	<b>T2A_U10, T2A_U17, T2A_U18</b>	<b>InzA_U03, InzA_U06, InzA_U07</b>
<b>K2S_CEB_U21</b>	is able to design and carry out research of components and materials used in general construction	<b>T2A_U08, T2A_U09, T2A_U11, T2A_U18</b>	<b>InzA_U01, InzA_U02, InzA_U07</b>
<b>K2S_CEB_U22</b>	is able to design chosen components of objects in the field of road building, bridges and railways as well as urban infrastructure in relation to problems of general construction	<b>T2A_U10, T2A_U17, T2A_U18, T2A_U19</b>	<b>InzA_U03, InzA_U06, InzA_U07, InzA_U08</b>
<b>K2S_CEB_U23</b>	is able to formulate and possesses ability to solve tasks related to chosen theoretical issues as well as to design components, structures and objects in civil engineering ( <i>subjects from elective modules</i> )	<b>T2A_U10, T2A_U17, T2A_U18, T2A_U19</b>	<b>InzA_U03, InzA_U06, InzA_U07, InzA_U08</b>



**MATRIX OF CORRELATION  
BETWEEN  
EDUCATIONAL OUTCOMES  
FOR THE FIELD OF TECHNICAL SCIENCES  
AND EDUCATIONAL OUTCOMES**

**for the field of study *Civil Engineering*  
2<sup>nd</sup> level study – general academic profile**

**Faculty of Civil Engineering  
Wroclaw University of Technology**

Description of symbols used in shortcuts :

**K2** – educational outcomes for the field of study

**W** – category of knowledge (W)

**U** – category of skills (U)

**K** (after the underscore) – category of personal and social competences (KPS)

**K2S** – educational outcomes related to the specialisation

**\_CEB\_** – reference to the specialisations respectively: Civil Engineering,

**T2A\_** – educational outcomes in the area of technical sciences for the second level study



**MATRIX OF CORRELATION BETWEEN EDUCATIONAL OUTCOMES FOR THE FIELD OF TECHNICAL SCIENCES  
AND EDUCATIONAL OUTCOMES FOR THE FIELD OF STUDY**

**Specialization: Civil Engineering**

Symbol of the educational outcomes in the area of technical sciences	Description of the educational outcomes for the area of technical sciences	The reference to the educational outcomes for the first level studies in the field of study civil engineering
<b>KNOWLEDGE</b>		
T2A_W01	has expanded and broadened knowledge of mathematics, physics and chemistry and other areas related to the studied discipline necessary to formulate and solve complex tasks in the field of the studied discipline	K2_W01, K2_W02, K2_W03, K2_W04, K2_W05
T2A_W02	has detailed knowledge in the field of study related to the studied discipline	K2_W02, K2_W03, K2_W07, K2_W08, K2_W09, K2_W10, K2_W11, K2_W14, K2S_CEB_W16, K2S_CEB_W17, K2S_CEB_W18, K2S_CEB_W19, K2S_CEB_W20, K2S_CEB_W21, K2S_CEB_W22
T2A_W03	has organized, general knowledge and theoretical grounding including key issues related to the studied discipline	K2_W06, K2_W07, K2_W08, K2_W09, K2_W10, K2S_CEB_W16, K2S_CEB_W17, K2S_CEB_W18, K2S_CEB_W19, K2S_CEB_W20, K2S_CEB_W21, K2S_CEB_W22
T2A_W04	has detailed knowledge and theoretical grounding connected with the chosen issues in the field of the studied discipline	K2_W02, K2_W03, K2_W04, K2_W05, K2_W06, K2_W07, K2_W09, K2S_CEB_W16, K2S_CEB_W17, K2S_CEB_W18, K2S_CEB_W19, K2S_CEB_W20, K2S_CEB_W21, K2S_CEB_W22
T2A_W05	has knowledge of trends in development and the most crucial and newest achievements in scientific disciplines and fields of study related to the	K2_W02, K2_W03, K2_W07, K2_W10, K2_W13, K2S_CEB_W16

	studied discipline and other related scientific disciplines	
<b>T2A_W06</b>	has fundamental knowledge of the lifecycle of devices, objects and technical systems	<b>K2_W06, K2_W10, K2_W11, K2_W13, K2S_CEB_W21</b>
<b>T2A_W07</b>	knows fundamental methods, techniques, tools and materials used for solving simple engineering tasks in the field of the studied discipline	<b>K2_W03, K2_W05, K2_W07, K2_W08, K2_W09, K2S_CEB_W16, K2S_CEB_W17, K2S_CEB_W18, K2S_CEB_W19, K2S_CEB_W20, K2S_CEB_W22</b>
<b>T2A_W08</b>	has fundamental knowledge necessary to understand social, economical, legal and other non-technical factors of engineering activities as well as taking them into consideration in engineering practice	<b>K2_W13, K2_W14,</b>
<b>T2A_W09</b>	has fundamental knowledge of management, including quality management and running a business	<b>K2_W11, K2_W12,</b>
<b>T2A_W10</b>	knows and understands basic concepts and rules related to industrial property protection and copyright laws and knows the necessity of these laws and rules in managing intellectual property resources; is able to use patent information resources	<b>K2_W15</b>
<b>T2A_W11</b>	knows general rules related to establishing and developing individual entrepreneurial activity, using knowledge of scientific disciplines and fields of study related to the studied discipline	<b>K2_W12</b>
<b>SKILLS</b>		
1) general skills ( not related to the area of engineering education)		
<b>T2A_U01</b>	is able to obtain information from literature, databases and other properly selected sources, either in English or another foreign language regarded as a language for international communication in the studied discipline ; is able to integrate obtained information, interpret and critically evaluate it, draw conclusions, formulate and justify opinions in full	<b>K2_U01, K2_U02, K2_U03, K2_U16, K2_U17</b>
<b>T2A_U02</b>	is able to communicate in their professional environment and other environments using various techniques, either in English or another foreign language regarded as a language for international communication in the studied discipline	<b>K2_U01, K2_U02, K2_U12, K2_U13, K2_U14</b>

T2A_U03	is able to prepare a scientific study in Polish language and also a short scientific report, with the results of own research, in a foreign language regarded as a basic one in the scientific disciplines and fields of study related to the studied discipline	K2_U01, K2_U02, K2_U17
T2A_U04	is able to prepare and give an oral presentation concerning detailed issues in the field of the studied discipline both in Polish and a foreign language	K2_U01, K2_U02, K2_U12
T2A_U05	is able to establish directions of further education and follow the process of self-learning	K2_U03, K2_U17
T2A_U06	has language skills in scientific disciplines and fields of study related to the studied discipline according to CEFR requirements for B2+ level	K2_U01, K2_U02
<b>2) fundamental engineering skills</b>		
T2A_U07	is able to use information and communication technologies necessary to perform tasks typical of engineering activities	K2_U01, K2_U08, K2_U12, K2_U13, K2_U17
T2A_U08	is able to plan and run experiments including measurements and computer simulations, interpret results and draw conclusions	K2_U08, K2_U09, K2_U15, K2_U16, K2_U17, K2S_CEB_U21
T2A_U09	is able to use analytical, simulation and experimental methods to formulate and solve engineering tasks as well as simple research problems	K2_U06, K2_U07, K2_U08, K2_U10, K2_U15, K2_U17, K2S_CEB_U21
T2A_U10	is able - while formulating and solving engineering tasks- to integrate knowledge of scientific disciplines and fields of studies appropriate for the specialization and apply the system approach which also takes into account non- technical aspects	K2_U05, K2_U07, K2_U08, K2_U10, K2_U11, K2_U13, K2_U14, K2_U17, K2S_CEB_U18, K2S_CEB_U20, K2S_CEB_U22, K2S_OBU_U23
T2A_U11	is able to formulate and test hypotheses connected with engineering problems and simple research problems	K2_U07, K2_U15, K2_U17, K2S_CEB_U21
T2A_U12	is able to assess the usefulness and possibilities of new achievements (technological and technical) in the field of the studied discipline	K2_U07, K2_U08, K2_U09, K2_U10, K2_U11, K2S_CEB_U18
T2A_U13	is prepared to work in an industry environment and knows safety rules in the workplace	K2_U13, K2_U14

T2A_U14	is able to carry out primary economic analysis of undertaken engineering activities	K2_U13, K2_U14
<b>3) skills directly connected with solving engineering tasks</b>		
T2A_U15	is able to carry out critical analysis of functioning and also assess – particularly in reference to the studied discipline- existing technical solutions, in particular devices, objects, systems, processes, and services	K2_U07, K2_U08, K2_U15, K2_U16
T2A_U16	is able to plan improvements in existing technical solutions	K2_U09, K2_U11, K2_U15, K2S_CEB_U18
T2A_U17	is able to identify and formulate specifications of complex engineering tasks specific for the studied discipline including untypical tasks considering their non-technical aspects	K2_U04, K2_U05, K2_U06, K2_U10, K2_U11, K2_U16, K2_U17, K2S_CEB_U18, K2S_CEB_U19, K2S_CEB_U20, K2S_CEB_U22, K2S_CEB_U23
T2A_U18	is able to assess the usefulness of methods and tools for solving an engineering task specific for the studied discipline, and notice limitations of these methods and tools; is able – by applying conceptually new methods- to solve complex engineering tasks specific for the studied discipline, including untypical tasks and tasks with a research component	K2_U04, K2_U06, K2_U07, K2_U09, K2_U10, K2_U11, K2_U16, K2_U17, K2S_CEB_U18, K2S_CEB_U19, K2S_CEB_U20, K2S_CEB_U21, K2S_CEB_U22, K2S_CEB_U23
T2A_U19	is able – according to a given specification which considers non – technical aspects- to design a complex device, object, system or process specific for the studied discipline and complete this project – at least partially- using appropriate methods, techniques and tools, adapting already existing tools or by creating new tools	K2_U06, K2_U10, K2_U11, K2_U12, K2_U16, K2S_CEB_U19, K2S_CEB_U22, K2S_CEB_U23
<b>SOCIAL COMPETENCES</b>		
T2A_K01	understands the necessity of a lifetime learning process; is able to inspire and organize the process of learning for others	K2_K01
T2A_K02	realizes the significance and understands non-technical aspects and consequences of engineering activity and especially its influence on the natural environment and the related responsibility for decisions	K2_K02
T2A_K03	is able to cooperate and work in a group, taking up different roles	K2_K03

<b>T2A_K04</b>	is able to set clear priorities leading to the realization tasks set by himself or others	<b>K2_K04</b>
<b>T2A_K05</b>	identifies correctly and solves dilemmas connected with the profession	<b>K2_K04</b>
<b>T2A_K06</b>	is able to think and act in an entrepreneurial way	<b>K2_K06</b>
<b>T2A_K07</b>	realizes the social role of technical university graduates and especially understands the need to formulate information and share it with society, e.g. through mass media, in relation to achievements in environmental engineering and other aspects of engineering activity; makes attempts at sharing such information and opinions in an understandable way	<b>K2_K06</b>



**MATRIX OF CORRELATION  
BETWEEN  
LEARNING OUTCOMES LEADING TO THE ENGINEERING  
COMPETENCES AND EDUCATIONAL OUTCOMES  
FOR THE SECOND LEVEL QUALIFICATIONS**

**for the field of study *Civil Engineering*  
second level studies – general academic profile**

**Faculty of Civil Engineering  
Wroclaw University of Technology**

Description of symbols used in shortcuts :

**K2**– educational outcomes for the field of study

**W** – category of knowledge

**U** – category of skills

**K** (after the underscore) – category of personal and social competences (KPS)

**K2S** – educational outcomes related to the degree specialisation

**\_CEB\_** – reference to the specialisations respectively: Civil Engineering,

**InzA\_** – learning outcomes leading to the engineering competences for the second level qualifications – general academic profile

**MATRIX OF CORRELATION BETWEEN LEARNING OUTCOMES LEADING TO THE ENGINEERING COMPETENCES AND EDUCATIONAL OUTCOMES FOR THE FIELD OF STUDY FOR THE SECOND LEVEL QUALIFICATIONS**

**Specialization: Civil Engineering**

Symbol of the educational outcomes leading to the engineering competences	Description of the educational outcomes leading to the engineering competences	The reference to the educational outcomes for the second level studies in the field of study <i>civil engineering</i>
<b>KNOWLEDGE</b>		
Inz_W01	has fundamental knowledge of the lifecycle of devices, objects and technical systems	K2_W06, K2_W10, K2_W11, K2_W13, K2S_CEB_W21
Inz_W02	knows fundamental methods, techniques, tools and materials used for solving simple engineering tasks in the field of the studied discipline	K2_W03, K2_W05, K2_W07, K2_W08, K2_W09, K2S_CEB_W16, K2S_CEB_W17, K2S_CEB_W18, K2S_CEB_W19, K2S_CEB_W20, K2S_CEB_W22
Inz_W03	has fundamental knowledge necessary to understand social, economical, legal and other non-technical factors of engineering activities	K2_W13, K2_W14,
Inz_W04	has fundamental knowledge of management, including quality management and running a business	K2_W11, K2_W12,
Inz_W05	knows typical technologies in the field of the studied discipline	K2_W02, K2_W03, K2_W04, K2_W05, K2_W06, K2_W07, K2_W08, K2_W09, K2_W10, K2_W11, K2_W13, K2S_CEB_W16, K2S_CEB_W17, K2S_CEB_W18, K2S_CEB_W19, K2S_CEB_W20, K2S_CEB_W21, K2S_CEB_W22
<b>SKILLS</b>		
Inz_U01	is able to plan and run experiments including measurements and computer simulations, interpret results and draw conclusions	K2_U08, K2_U09, K2_U15, K2_U16, K2_U17, K2S_CEB_U21
Inz_U02	is able to use analytical, simulation and experimental methods to formulate and solve engineering tasks	K2_U06, K2_U07, K2_U08, K2_U10, K2_U15, K2_U17, K2S_CEB_U21



<b>Inz_U03</b>	is able - while formulating and solving engineering tasks-to notice their system and non technical aspects	<b>K2_U05, K2_U07, K2_U08, K2_U10, K2_U11, K2_U13, K2_U14, K2_U17, K2S_CEB_U18, K2S_CEB_U20, K2S_CEB_U22, K2S_OBU_U23</b>
<b>Inz_U04</b>	is able to carry out primary economic analysis of undertaken engineering activities	<b>K2_U13, K2_U14</b>
<b>Inz_U05</b>	is able to carry out critical analysis of functioning and also assess – particularly in reference to the studied discipline- existing technical solutions, in particular devices, objects, systems, processes, and services	<b>K2_U07, K2_U08, K2_U15, K2_U16</b>
<b>Inz_U06</b>	is able to identify and formulate specifications of simple, practical engineering tasks specific for the studied discipline	<b>K2_U04, K2_U05, K2_U06, K2_U10, K2_U11, K2_U16, K2_U17, K2S_CEB_U18, K2S_CEB_U19, K2S_CEB_U20, K2S_CEB_U22, K2S_CEB_U23</b>
<b>Inz_U07</b>	is able to assess the usefulness of routine methods and tools for solving a simple, practical engineering task specific for the studied discipline and choose and apply a proper method and tools	<b>K2_U04, K2_U06, K2_U07, K2_U09, K2_U10, K2_U11, K2_U16, K2_U17, K2S_CEB_U18, K2S_CEB_U19, K2S_CEB_U20, K2S_CEB_U21, K2S_CEB_U22, K2S_CEB_U23</b>
<b>Inz_U08</b>	is able – according to a given specification- to desing and complete a simple device, object, system or process specific for the studied discipline, using appropriate methods, techniques and tools	<b>K2_U06, K2_U10, K2_U11, K2_U12, K2_U16, K2S_CEB_U19, K2S_CEB_U22, K2S_CEB_U23</b>
<b>SOCIAL COMPETENCES</b>		
<b>Inz_K01</b>	realizes the significance and understands non-technical aspects and consequences of engineering activity and especially its influence on the natural environment and the related responsibility for decisions	<b>K2_K02</b>
<b>Inz_K02</b>	is able to think and act in an entrepreneurial way	<b>K2_K06</b>

