



Poznan University of Technology

Faculty of Civil and Environmental Engineering

Graduate attributes for a field of study*

1. Name of the field of study **CIVIL ENGINEERING**

- engineer – general academic profile
level 6 qualifications within the National Qualifications Framework
first-level studies, full-time and part-time

Studies in the field of CIVIL ENGINEERING constitute an integral part of the mission and strategy related to the development of the Faculty of Civil and Environmental Engineering as well as are an essential element of the mission and strategy connected with the development of Poznan University of Technology in spreading technical education at the university level both in Poland and Europe.

Out of two statutory study profiles, general academic and practical, teaching provided follows the general academic profile as a long-established tradition of technical higher education in Poland.

2. Locating the field of study in the area

The Civil Engineering field of study belongs to the area of technical studies.

The Civil Engineering field of study is closely connected with the following fields of study: **Environmental Engineering, Management, Architecture and Urban Planning, Electrical Engineering, Materials Engineering**. Relations with the above fields of study, even though not evidently defined in education outcomes and the study program in the field of Civil Engineering, essentially complement the description of the studies.

3. Reference to international benchmarks

The preparation of the following education outcomes is supported by its reference to international standards formulated by organizations such as: American ABET (Accreditation Board for Engineering and Technology), Japanese JABEE (Japan Accreditation Board for Engineering Education), IEA (International Engineering Alliance), FEANI (Fédération Internationale d'Associations Nationales d'Ingénieurs), EUR-ACE (European Accredited Engineer Project) and CDIO (Conceive Design Implemented Operate Initiative). The closest attention has been paid to FEANI requirements through accreditation requirements formulated by EUR-ACE.

*Accepted by the Resolution of the Council of the Faculty of Civil and Environmental Engineering of Poznan University of Technology of 30 March 2012.

4. Area descriptors included in the description of the field of study

The description of the field of study encompasses education outcomes for the general academic profile in the education area within the range of technical sciences, arising from appendix No. 5 to the Regulation of the Minister of Science and Higher Education of 2 November 2011 concerning the National Qualifications Framework for Higher Education (Journal of Laws No. 253, item 1520) as well as conditions relating to conducting the study process in a given field of study and at a given level of education, from the Regulation of the Minister of Science and Higher Education of 5 October 2011 (Journal of Laws No. 243, item 1445).

5. Educational objectives

The educational objectives at the first-cycle studies in the field of Civil Engineering of the general academic profile are:

- 1) to impart engineering knowledge in the area of civil engineering, designing structures, performing construction works and preparing a person to fulfill managerial functions in civil engineering;
- 2) to develop the skills of identifying and solving fundamental problems concerning the construction industry;
- 3) to prepare a graduate to perform independent technical functions and to team work in civil engineering.

6. Education outcomes for a field of study

On completing the first-cycle studies of the general academic profile in the field of Civil Engineering, a graduate, on the basis of knowledge obtained, is prepared to make decisions concerning an appropriate use of building materials, designing residential public and industrial structures road, railway and bridge construction, application of appropriate technologies and developing their implementation, and managing construction works. The graduate can make and read technical drawings, interpret cartographic and geodesic elaborations. Knows the principles of the theory of construction and structures, can formulate and create computational models of simple building structures and obtain and interpret computation results. Can design simple structures and dimension steel, concrete, timber and masonry construction elements. Knows the principles of geotechnical engineering and can design foundations of a simple structure. Knows the principles for analysis effectiveness, costs and duration of construction works. Makes use of computer methods in the design and supervision of construction works. Knows current trends in design of construction works. Can work in a team and draw up a report of the course of work done and design. Can critically choose arguments supporting decisions concerning performance of tasks in the construction industry. Knows and applies provisions of construction law. Applies rules for work health and safety. Bears responsibility for his/her work and ensures safety at work for own co-workers. Is aware of the need to advance personal and professional competencies. Follows ethical principles. Is prepared to take up second-cycle studies in the field of Civil Engineering.

Detailed education outcomes at the first-cycle studies in the field of Civil Engineering and their reference to outcomes for the area of technical sciences

Key to symbols:

K – education outcomes for a given field of study

W – category of knowledge

U – category of skills

K – category of personal and social competencies

T1A – area education outcomes for technical sciences for the first-cycle studies of the general academic profile

Education outcomes for a field of study (K)	DESCRIPTION OF FIELD-RELATED EDUCATION OUTCOMES On completing the first-cycle studies in the field of CIVIL ENGINEERING, a graduate:	Reference to education outcomes for the area of technical sciences (T1A_)
KNOWLEDGE		
K_W01	has knowledge of various branches of mathematics, physics, chemistry and other scientific areas which are useful to formulate and solve problems connected with civil engineering,	T1A_W01
K_W02	knows principles of descriptive geometry and technical drawing related to creating and reading architectural drawings, building drawings, geodesic maps in the computer software,	T1A_W01, T1A_W02, T1A_W07
K_W03	knows how to define map projections; knows fundamental geodesic works required in the construction process,	T1A_W02, T1A_W04
K_W04	has knowledge of general mechanics and strength of materials, materials modelling and principles of design structures,	T1A_W02, T1A_W03, T1A_W06
K_W05	knows principles of construction theory of structures and of analysis of bar structures in the range of statics, dynamics and stability,	T1A_W03, T1A_W07
K_W06	is acquainted with construction law, national norms and EN standards and technical conditions for of structure construction,	T1A_W03, T1A_W07, T1A_W08, T1A_W13
K_W07	knows rules of designng and dimensioning for steel, concrete, steel-concrete composite, timber and masonry elements and joints of structures,	T1A_W03

K_W08	knows geology fundamentals, soil mechanics and foundations construction structures,	T1A_W04
K_W09	knows rules related to the design and analysis of residential, industrial, road, railroad and bridge structures ,	T1A_W04, T1A_W05
K_W10	has a fundamental knowledge for designing general road and railway transport,	T1A_W02
K_W11	knows selected analysis, infrastructure and management computer software for construction,	T1A_W01, T1A_W02, T1A_W05, T1A_W07
K_W12	knows the rules of the industrial production of basic building materials and elements, their assembly, selection of tools, machines and equipment to carry out work, technologies of building construction,	T1A_W02, T1A_W04
K_W13	knows fundamentals of physics construction related to heat and moisture transfer in structures, of energy supply and of basic rules concerning the choice of building installations,	T1A_W01, T1A_W02, T1A_W04
K_W14	knows the most commonly used building materials and their properties, fundamental elements of their design, manufacturing and testing technologies; knows methods of the evaluation and technical maintenance of a structure,	T1A_W02, T1A_W05, T1A_W10, T1A_W11
K_W15	has knowledge of construction management rules related to building processes and creating for construction management quality; knows norms and standards of work in the construction industry,	T1A_W08, T1A_W09
K_W16	has a fundamental knowledge of running a business in the area of the construction industry,	T1A_W08-11 T1A_K06
K_W17	has a fundamental knowledge of spatial planning, relationships between architecture and urban planning under technical and economical possibilities of civil engineering, as well as of an influence of a construction investment on the environment,	T1A_W05, T1A_W06, T1A_W08

SKILLS

K_U01	can classify civil engineering structures,	T1A_U12, T1A_U14
K_U02	can evaluate and list loads acting on structures,	T1A_U09, T1A_U12, T1A_U14
K_U03	can appropriately define computational models used for the structur analysis,	T1A_U07-09, T1A_U13
K_U04	can make a static analysis of statically determinate and indeterminate bar structures; can determine eigen frequencies for simple bar structures,	T1A_U07, T1A_U09, T1A_U13

K_U05	can make an adequate choice of tools (analytical or numerical) for solving problems related to the analysis and design of structures and planning construction works; can obtain and verify results,	T1A_U01, T1A_U03, T1A_U06-09, T1A_U10, T1A_U15
K_U06	can make use of selected computer programs for decision in construction; can critically assess the results of numerical results,	T1A_U06, T1A_U07, T1A_U09, T1A_U15
K_U07	can design selected elements and simple: metal, concrete, steel-concrete composite, timber and masonry structures.	T1A_U07, T1A_U09, T1A_U14, T1A_U16
K_U08	can dimension basic structural elements in structures of residential, public, industrial construction engineering, road, railways, bridges infrastructures,	T1A_U06, T1A_U07, T1A_U09, T1A_U14, T1A_U16
K_U09	can design simple foundations of structures for residential, public, industrial construction engineering, road, railways, bridges infrastructures,	T1A_U07, T1A_U08, T1A_U10
K_U10	can perform a dynamic analysis of simple bar structures regarding an evaluation of resonance states,	T1A_U07, T1A_U13
K_U11	can perform analyses of linear stability and ultimate load bearing capacity of simple bar systems regarding an evaluation of critical and ultimate states of structures,	T1A_U07, T1A_U13
K_U12	can draw up a building's energy balance and cooperate to design build-in comfort in build- in,	T1A_U08, T1A_U10, T1A_U12
K_U13	can carry out simple laboratory experiments in order to evaluate the quality of construction materials and engineering structures,	T1A_U06 T1A_U08, T1A_U13
K_U14	can read architectural drawings, construction drawings, installation and geodesic drawings, make a construction inventory and draw up graphic documentation in selected computer software,	T1A_U02, T1A_U03, T1A_U14, T1A_U16
K_U15	can allocate costs, set prices and draw up a simple cost estimate and a schedule of construction works,	T1A_U07, T1A_U10, T1A_U12
K_U16	can assess risks analysis in the process of construction and implement appropriate rules of work safety and technical maintenance of construction,	T1A_U02, T1A_U10, T1A_U11, T1A_K02
K_U17	makes use of IT, Internet resources and other sources in order to access information, communicate and acquire software which can assist in the work of a designer and a construction manager,	T1A_U01, T1A_U04, T1A_U05

K_U18	has an ability to communicate in a foreign language, including technical vocabulary from the field of civil engineering,	T1A_U02, T1A_U03, T1A_U04, T1A_U06
K_U19	can apply the provisions of construction law and legal acts relating to construction,	T1A_U04
K_U20	can analyze investors' architectural and urban needs and select building materials in accordance with their designation,	T1A_U02, T1A_U03, T1A_U04
K_U21	can organize work at the building site in accordance with technological rules and civil engineering management principles.	T1A_U08-11, T1A_K03

SOCIAL COMPETENCIES

K_K01	can work on a problem individually and in a team,	T1A_K03, T1A_K04, T1A_K06
K_K02	bears responsibility for reliability and correct interpretation of own results,	T1A_K04, T1A_K05, T1A_U03, T1A_U04
K_K03	independently complements and extends knowledge of modern techniques, processes and technologies,	T1A_K01, T1A_U03-05
K_K04	is aware of own health and fitness,	T1A_K03
K_K05	bears responsibility for own and team's work safety,	T1A_K03
K_K06	is aware of the necessity to advance professional and personal competencies,	T1A_K03
K_K07	can formulate opinions about technical and technological processes in civil engineering,	T1A_K07, T1A_U03, T1A_U04
K_K08	understands the need to present the knowledge related to civil engineering in universally comprehensible way,	T1A_K07, T1A_U02
K_K09	formulates conclusions to the public and describes the results of own work; is communicative in media presentations,	T1A_K01, T1A_U03, T1A_U04
K_K10	acts in accordance with ethical principles.	T1A_K03