



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**

**Master – general academic profile
level 7 qualifications within the National Qualifications
Framework
second- 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**. 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 these 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.

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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

- 1) to impart knowledge related to the design, analysis and operate of structures and management of construction projects;
- 2) to develop skills of identifying and solving fundamental tasks concerning the construction industry;
- 3) to prepare a graduate to perform self-dependent technical functions in the construction industry, at positions related to work performance, design, management and supervision of own and team work;
- 4) to acquire skills for an autonomous analysis of new problems and to solve them in scientific research work.

6. Education outcomes for a field of study

On completing the second-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 structures and building projects. Knows current trends in designing construction asks. Applies work health and safety rules. Can design structures, knows principles of theory of construction and structures, can formulate, create and apply appropriate computational models using appropriate technologies, developing their implementation and management construction. Can make and read technical drawings, interpret cartographic and geodesic elaborations. Can formulate and solve non-typical engineering, technical and organizational problems connected with construction. Makes use of modern computer techniques which aid designing structures and construction projects. Can critically select arguments supporting collective decisions pertaining performance of tasks in construction. Can draw up and, if necessary, publish reports of the course of work done. Can work in a team and supervise team work. Bears responsibility for work safety of the supervised team. Is aware of the need to advance professional and personal competencies. Follows ethical principles. Knows and applies the provisions of construction law. Is prepared to take up the third-cycle studies in the field of Civil Engineering.

Detailed education outcomes at the second-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

T2A – area education outcomes for technical sciences for the second-cycle studies of the general academic profile

Education outcomes for a field of study (K)	DESCRIPTION OF FIELD-RELATED EDUCATION OUTCOMES On completing the second-cycle studies in the field of CIVIL ENGINEERING, a graduate:	Reference to education outcomes for the area of technical sciences (T2A)
KNOWLEDGE		
K_W01	has an advanced knowledge of mathematics (*), physics and chemistry, being the basis of subjects in the area of the theory of materials and structures, technological processes and organizational-investment strategies,	T2A_W01
K_W02	knows principles of analyzing, constructing and dimensioning elements and joints in structures (*),	T2A_W02, T2A_W03, T2A_W04 T2A_W07
K_W03	has knowledge of solid mechanics; knows principles of analyzing problems related to statics, stability and dynamics of structures (*),	T2A_W014 T2A_W041
K_W04	has knowledge of advanced issues related to strength of materials, materials modelling and civil engineering structures (*),	T2A_W01 T2A_W02 T2A_W04
K_W05	knows principles of producing construction materials and goods (*),	T2A_W02 T2A_W07 T2A_W10
K_W06	knows advanced methods of thermal and moisture protection, design and use energy-saving buildings (*),	T2A_W01 T2A_W02
K_W07	knows construction materials and goods and constructions technologies (*),	T2A_W03 T2A_W06
K_W08	knows classification and utility scope of computer software for analysis and design of structures as well as planning and management projects (*),	T2A_W02 T2A_W03 T2A_W04 T2A_W07
K_W09	has knowledge of analysis and optimization of structural	T2A_W07

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	elements and complex building systems, methods for solving problems and carrying out non-linear calculations of structures (*),	
K_W10	knows the procedures of quality management of construction projects (*); has knowledge about effectiveness, costs and time of construction projects realisation under risky conditions or uncertainty,	T2A_W02 T2A_W03 T2A_W04 T2A_W07 T2A_W09
K_W11	has knowledge related to a business in the construction industry (*); understands principles of company financial operations,	T2A_W08 T2A_W09 T2A_W11
K_W12	knows geodesic and cartographic projections, knows, measurements, geodesic works and structure health monitoring (*),	T2A_W02 T2A_W03
K_W13	has knowledge of investments and existing structures influence on the environment (*),	T2A_W05 T2A_W06 T2A_W08 T2A_W09
K_W14	knows standards and conditions for designing structures and their elements (*),	T2A_W03 T2A_W04
K_W15	knows principles of foundations of structures construction (*),	T2A_W03
K_W16	knows principles of design, construction and operation of construction structures (*),	T2A_W03 T2A_K06
K_W17	knows and applies the provisions of construction law (*),	T2A_W02 T2A_W04 T2A_W07 T2A_W08
K_W18	knows elements of patent and intellectual property protection law,	T2A_W08 T2A_W10 T2A_W11
K_W19	has knowledge related to infrastructure (*) management in the full life cycle of structures,	T2A_W02 T2A_W05 T2A_W06

SKILLS

K_U01	can evaluate and list loads acting on structures,	T2A_U10
K_U02	can classify civil engineering structures (*),	T2A_U17
K_U03	can design elements and joints in complex structures (*),	T2A_U08 T2A_U16
K_U04	can carry out static, dynamic and stability analyses of structures (*),	T2A_U08 T2A_U017-19
K_U05	makes use of dedicated tools to find useful information,	T2A_U01 T2A_U02

K_U06	communicate and offer computer aided design and management (*),	T2A_U04 T2A_U12 T2A_U13
	can define a computer model and carry out an advanced analysis of complex structures, elements and using linear and non-linear techniques (*),	T2A_U08 T2A_U10 T2A_U12
	can critically assess results of a numerical analysis of structures (*),	T2A_U06-08 T2A_U12
K_U07	can draw up and analyze an energy balance of a structure (*), select materials and building technologies for an ecological, sustainable and energy-efficient construction in complex conditions,	T2A_U03 T2A_U04 T2A_U12-17
K_U08	can dimension complex structural detail in civil engineerin structures (*),	T2A_U15-17
K_U09	can draw up a schedule of construction work, a cost estimate, a contract or a business plan of a construction project; can manage construction processes, set responsibilities and tasks of investment and building supervision (*),	T2A_U02-04 T2A_U10 T2A_U13 T2A_U14
K_U10	can plan and carry out laboratory experiments which lead to a quality evaluation of materials used and an evaluation of strength of structure elements (*),	T2A_U08 T2A_U09 T2A_U10
K_U11	can analyze risks of performance of construction projects and operations; can implement appropriate safety measures and principles (*); can develop work norms and standards as well as quality management procedures,	T2A_U13
K_U12	can select analytical or numerical tools to solve technical problems (*),	T2A_U09 T2A_U12
K_U13	has an ability to communicate in a foreign language, including technical vocabulary from the field of civil engineering (*),	T2A_U02 T2A_U04-06
K_U14	can design foundations of building structures (*),	T2A_U08 T2A_U10 T2A_U12
K_U15	can prepare a design and write a technical documentation (*) using a selection of computer software,	T2A_U02 T2A_U06 T2A_U07 T2A_K10
K_U16	can, in accordance with scientific principles and utilising appropriate research methods, formulate and carry out preliminary research work which leads to solving structural, technological and organizational problems occurring in civil engineering (*),	T2A_U08 T2A_U11 T2A_U15 T2A_U16 T2A_U17
K_U17	can prepare elaborations talking him/her to for up	T2A_U01 T2A_U04-05 T2A_U12
K_U18		

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	scientific work.	T2A_U16 T2A_U18
SOCIAL COMPETENCIES		
K_K01	can work on a problem individually and in a team; can manage a team,	T2A_K04
K_K02	bears responsibility for the reliability of results obtained through his/her own achievements and for the evaluation of the work done by the team he/she supervises,	T2A_K05
K_K03	Self dependently complements and widens his/her knowledge of modern processes and technologies in civil engineering,	T2A_K01
K_K04	is aware of the need for sustainable and energy-efficient development in civil engineering,	T2A_K02 T2A_K05
K_K05	bears responsibility for own and team work safety,	T2A_K03
K_K06	is aware of the necessity to advance professional and personal competencies,	T2A_K03
K_K07	can formulate and present opinions about civil engineering,	T2A_K06 T2A_U07
K_K08	understands a need to present civil engineering to the public knowledge,	T2A_K06 T2A_U07
K_K09	presents civil engineering to the public knowledge in a universally comprehensible way,	T2A_K06 T2A_U07
K_K10	formulates conclusions and describes the results of his/her own research; presents significant results during scientific-technical conferences and publishes them in academic journals; can communicate effectively with the media,	T2A_K01 T2A_K03 T2A_U05
K_K11	follows financial rules in the operation of businesses; acts in accordance with ethical principles,	T2A_K01 T2A_U02
K_K12	participates in cultural life of a town/city, region and country; takes care of local history and tradition,	T2A_K02 T2A_U04
K_K13	takes care of own health and fitness through physical exercise, recreation, convalescence and organization of active rest.	
	(*) According to appropriate study specialisation: building structures, technology and organisation of construction, road construction, railroad construction, bridge construction, energy efficient construction.	