

Detailed learning outcomes and their reference to outcomes in technical sciences

Codes:

K – programme-specific learning outcomes

W – knowledge category

U – skills category

K (after the underscore) – personal and social competencies category (KPS)

T2A – learning outcomes in the field of technical sciences for graduate studies, general academic profile

Major: Power Engineering Level of education: graduate studies Education profile: general academic		
Code	Programme-specific learning outcomes	Reference to outcomes in technical sciences (T2A)
KNOWLEDGE – He/she ...		
K2A_W01	demonstrates knowledge necessary to understand social, economic, legal and other non-technical conditions of an engineer's work and their consideration in engineering practice	T2A_W08
K2A_W02	demonstrates knowledge of fundamental grammatical and lexical concepts, and uses them in a communicative way (a foreign language).	T2A_W05
K2A_W03	demonstrates fundamental knowledge of management, including quality management and business operation	T2A_W09, T2A_W10
K2A_W04	is familiar with general principles of establishment and development of individual enterprises which use the knowledge from the disciplines and areas of the studied programme	T2A_W10, T2A_W11
K2A_W05	demonstrates broad and deep knowledge of mathematics, physics and other areas, used for formulating and solving complex tasks specific to the field of Power Engineering	T2A_W01
K2A_W06	demonstrates deep knowledge of principles of conducting physical measurements and describing their results, types of measurement uncertainties, ways of their determination and expression	T2A_W01, T2A_W02, T2A_W03
K2A_W07	is familiar with advanced numerical methods and procedures, as well as programming concepts and computing capabilities	T2A_W01, T2A_W02, T2A_W03
K2A_W08	demonstrates advanced knowledge of technical and chemical thermodynamics	T2A_W02, T2A_W03
K2A_W09	demonstrates advanced knowledge of describing mass, momentum and energy transfer, and is familiar with methods of solving such problems	T2A_W02, T2A_W03
K2A_W10	demonstrates broad knowledge of technologies used in conventional	T2A_W02,

	and nuclear power engineering	T2A_W03, T2A_W04, T2A_W05
K2A_W11	is familiar with the methods used for selection of basic power engineering equipment	T2A_W02, T2A_W03, T2A_W04, T2A_W06, T2A_W10
K2A_W12	demonstrates knowledge in materials engineering, in particular, properties of materials used in high-temperature power engineering	T2A_W02, T2A_W03, T2A_W04, T2A_W05, T2A_W07
K2A_W13	is familiar with advanced methods of using renewable energy resources	T2A_W02, T2A_W03, T2A_W04, T2A_W07
K2A_W14	is familiar with advanced methods of energy assessment of processes	T2A_W02, T2A_W03, T2A_W04, T2A_W07
K2A_W15	demonstrates knowledge of fossil fuel resources, their physical and chemical properties, as well as processes of their use	T2A_W02, T2A_W03, T2A_W04, T2A_W07
K2A_W16	is familiar with the principles of using the waste-to-energy process	T2A_W02, T2A_W03, T2A_W04, T2A_W07
K2A_W17	demonstrates specialist knowledge which enables to solve problems related to the studied programme	T2A_W04, T2A_W05, T2A_W07, T2A_W10
SKILLS – He/She ...		
1) general skills (unrelated to the field of engineering studies)		
K2A_U01	collects information from literature, data bases and other well selected sources, also in English, integrating all the obtained information, interpreting it, drawing conclusions and justifying opinions	T2A_U01
K2A_U02	communicates by using various techniques, also in English, both in professional and other environments	T2A_U02
K2A_U03	prepares a well documented analysis, such as a technical report, both in Polish and in English	T2A_U03
K2A_U04	prepares and presents, both in Polish and in a foreign language, an	T2A_U04

	oral presentation regarding detailed concepts in the field of power engineering	
K2A_U05	reads the specialist press (also in English) and self-educates him/herself	T2A_U05
K2A_U06	demonstrates linguistic skills which meet the requirements for B2+ level of the English language and A1 of a second foreign language, as specified in the Common European Framework of Reference for Languages; demonstrates the skills of using English specialist terminology in the field of power engineering	T2A_U06
2) basic engineering skills		
K2A_U07	conducts physical measurements, as well as describes and presents their results in a clear way	T2A_U08
K2A_U08	uses modern computer software in engineering tasks and basic research problems related to construction of machines, equipment and modelling of electric power systems	T2A_U07, T2A_U08, T2A_U10
K2A_U09	builds complex models of technological processes, as well as analyses them by using analytical, experimental methods and conducts simulations of those processes	T2A_U09, T2A_U10
K2A_U10	formulates and tests hypotheses related to engineering problems and basic research problems in the field of power engineering	T2A_U11
K2A_U11	assesses suitability and usability of new achievements (techniques and technologies) in the field of power engineering	T2A_U12
K2A_U12	is prepared to work in an industrial environment and is familiar with safety rules related to such work	T2A_U13
K2A_U13	conducts an initial economic analysis of undertaken engineering activities	T2A_U14
K2A_U14	prepares documents of a report/article type, which present results of his/her own analyses	T1A_U07, T2A_U08, T2A_U09
3) skills directly related to performing engineering activities		
K2A_U15	demonstrates the skills of using the principles and methods of thermodynamics, mass and heat transfer, as well as liquid mechanics	T1A_U15, T1A_U16
K2A_U16	conducts technical and economic analysis of designed technological systems	T2A_U15, T2A_U16, T2A_U17, T2A_U18, T2A_U19
K2A_U17	selects fuel types for the needs of energy processes being implemented and/or designed	T2A_U15, T2A_U16, T2A_U18, T2A_U19
K2A_U18	formulates equations of mathematical models describing properties and functioning of electric power systems and their elements in steady and transition states	T2A_U17, T2A_U19
K2A_U19	uses mathematical methods in solving engineering problems and	T2A_U15,

	basic research tasks regarding physical and chemical processes in the field of power engineering	T2A_U16, T2A_U18, T2A_U19
K2A_U20	uses commercial calculation software and creates his/her own computer tools for mathematical modelling purposes	T2A_U15, T2A_U16, T2A_U18, T2A_U19
K2A_U21	implements test methods in process analyses in the field of heat power engineering	T2A_U15, T2A_U17, T2A_U18
K2A_U22	conducts extensive analysis of the impact of selected process parameters on process capacity/watt-hour efficiency	T2A_U17
K2A_U23	uses advanced methods facilitating the process of solving practical technical and economic problems in the field of power engineering	T2A_U15, T2A_U16, T2A_U18
K2A_U24	selects basic power engineering machines, depending on the process type	T2A_U15, T2A_U19
K2A_U25	formulates and solves an engineering problem and a basic research problem in the area of the studied programme	T2A_U15, T2A_U16, T2A_U17, T2A_U18, T2A_U19
K2A_U26	assesses effects of technological solutions related to the studied programme	T2A_U15, T2A_U16, T2A_U17, T2A_U18, T2A_U19
PERSONAL AND SOCIAL COMPETENCIES		
K2A_K01	understands the need for lifelong learning, inspires and organises the learning process for others	T2A_K01
K2A_K02	is aware of the importance of understanding non-technical aspects and effects of an engineer's work, including its impact on the environment and responsibility for the decisions taken in this respect	T2A_K02
K2A_K03	cooperates and works in a team, assuming various roles	T2A_K03
K2A_K04	clearly determines priorities in performance of a task set by him/herself or others	T2A_K04
K2A_K05	correctly identifies and solves dilemmas related to his/her profession	T2A_K05
K2A_K06	thinks and acts in a creative and enterprising manner	T2A_K06
K2A_K07	is aware of the social role of a technical university graduate and understands the need to formulate and provide information, as well as opinions regarding technological achievements and other aspects of an engineer's work, to the society via, among other channels, the mass media; undertakes efforts to provide such information and opinions in a generally comprehensible way with justification of different points of view	T2A_K07

