Nazwa kierunku: Fizyka techniczna ***/ Field of study: Technical Physics***

Profil – ogólnoakademicki[1] ***/ Profile - academic***

Poziom studiów: pierwszego stopnia[2] ***/ Level of study: first degree***

Dziedzina: nauk ścisłych i przyrodniczych, dyscyplina naukowa: nauki fizyczne[3] ***/ Field: exact and natural sciences, scientific discipline: physical sciences***

Poziom Polskiej Ramy Kwalifikacji - 6[4] ***/ The level of the Polish Qualifications Framework - 6***

Symbole efektów kierunkowych **Symbols**	Kierunkowe efekty uczenia się **Learning outcomes**	Odniesienie do uniwersalnych charakterystyk PRK[5] **Reference to universal characteristics PRK**	Odniesienie do charakterystyki drugiego stopnia PRK dla właściwego poziomu[6] **Reference to the second stage of PRK characteristics for the relevant level**
1	**2**	**3**	**4**
	KNOWLEDGE,	Kod składnika opisu **Code**	Kod składnik opisu **Code**
K_W01	The graduate knows and understands the laws of physics: mechanics, electricity and magnetism, thermodynamics, optics, and astronomy to an advanced level.	P6U_W	P6S_WG

[1] Wpisać właściwe: ogólnoakademicki lub praktyczny
[2] Wpisać właściwe: pierwszego stopnia, drugiego stopnia lub jednolite studia magisterskie.
[3] Wpisać zgodnie z rozporządzeniem Ministra Nauki i Szkolnictwa Wyższego z dnia 20 września 2018 r. *w sprawie dziedzin nauki i dyscyplin naukowych oraz dyscyplin artystycznych*. Kierunek należy przyporządkować do co najmniej 1 dyscypliny. W przypadku przyporządkowania kierunku studiów do więcej niż 1 dyscypliny wskazuje się dyscyplinę wiodącą, w ramach której będzie uzyskiwana ponad połowa efektów uczenia (liczona wg. punktów ECTS). Należy wskazać % udział poszczególnych dziedzin i dyscyplin.
[4] Wpisać właściwe: studia pierwszego stopnia – poziom 6, studia drugiego stopnia lub jednolite studia magisterskie – poziom 7.
[5] Należy odnieść się do właściwego poziom PRK 6-8 zgodnie z załącznikiem do ustawy z dnia 22 grudnia 2015 r. *o Zintegrowanym Systemie Kwalifikacji*
[6] Odniesienie do charakterystyk drugiego stopnia efektów uczenia sią dla kwalifikacji na poziomach 6-8 Polskiej Ramy Kwalifikacji typowych dla kwalifikacji uzyskiwanych w ramach systemu szkolnictwa wyższego i nauki po uzyskaniu kwalifikacji pełnej na poziomie 4 – zgodnie z rozporządzeniem Ministra Nauki i Szkolnictwa Wyższego z dnia 14 listopada 2018 r. *w sprawie charakterystyk drugiego stopnia efektów uczenia się dla kwalifikacji na poziomach 6-8 Polskiej Ramy Kwalifikacji.* W przypadku studiów inżynierskich powinny uwzględniać również możliwość uzyskania wszystkich kompetencji inżynierskich, o których mowa w cz. III rozporządzenia. Efekty uczenia sią dla kierunków z dziedziny sztuki powinny zawierać odniesienia również do cz. II rozporządzenia.

K_W02	The graduate knows and understands the mathematical apparatus required to describe and analyze physical laws and models.	P6U_W	P6S_WG
K_W03	The graduate knows and understands the mathematical physics methods that allow him/her to describe classical and quantum mechanics problems to an advanced level.	P6U_W	P6S_WG
K_W04	The graduate knows and understands the assumptions and achievements of the leading areas of modern physics, theoretical models, and experimental methods of atomic, nuclear, and solid-state physics to an advanced level.	P6U_W	P6S_WG
K_W05	The graduate has basic knowledge of disciplines related to his/her field of studies, such as chemistry, biology, and computer science, enabling him/her to understand, create and solve interdisciplinary problems.	P6U_W	P6S_WG
K_W06	The graduate knows and understands to an advanced level the construction of setups to perform physical experiments and research applied in medicine and industry.	P6U _W	P6S_WG
K_W07	The graduate knows and understands the theoretical aspects of construction and principles of operation of scientific apparatus and equipment used in research related to the studied specialization (medical physics).	P6U_W	P6S_WG
K_W08	The graduate knows basic methods, techniques, tools, and materials used in solving simple engineering tasks related to the technical application of physics and the life cycle of devices**.**	P6U_W	P6S_WG
K_W09	The graduate knows the operation and maintenance of basic devices and machines; he/she knows the basic safety and hygiene principles applicable in a mechanical workshop and laboratory.	P6U_W	P6S_WG
K_W10	The graduate knows and understands the principles of creating technical drawings in the scope, enabling an independent design of devices and systems, and knows basic drawing software.	P6U_W	P6S_WG
K_W11	The graduate knows and understands the legal and ethical principles of industrial property protection and copyright law concerning technical physics.	P6U _W	P6S_WK
K_W12	The graduate knows basic financial, accounting, and management principles related to engineering activity, including different forms of creating and developing business.	P6U_W	P6S_WK
K_W13	The graduate knows and understands fundamental dilemmas related to the development of technology and engineering and their impact on the development of civilization.	P6U _W	P6S_WK
	SKILLS,	**Kod składnika opisu** **Code**	**Kod składnik opisu** **Code**
K_U01	The graduate can use the mathematical apparatus to describe, analyze and interpret physical laws and theories.	P6U_U	P6S_UW
K_U02	The graduate can plan, perform, describe an experiment, estimate the measurement uncertainty, present and interpret results of measurements, and draw conclusions.	P6U_U	P6S_UW
K_U03	The graduate can use selected computer programs for text processing, making calculations, graphical presentation of results, and computer simulations.	P6U_U	P6S_UW
K_U04	The graduate can formulate and solve complex and non-typical problems related to technical physics.	P6U_U	P6S_UW
K_U05	The graduate can apply analytical, simulation, and experimental methods to identify and solve engineering tasks.	P6U_U	P6S_UW
K_U06	The graduate can search for the source information in the field of study and make an assessment, critical analysis, and synthesis of information in the field of technical physics.	P6U_U	P6S_UW
K_U07	The graduate can analyze the structure, operation, and performance of devices and systems related to the studied specialization (medical physics).	P6U_U	P6S_UW
K_U08	The graduate can constructively analyze and critically evaluate the functioning of existing technical solutions used in technical physics.	P6U_U	P6S_UW

K_U09	The graduate can design and make to specification a simple device, system, or process using appropriately selected methods, tools, and materials.	P6U_U	P6S_UW
K_U10	The graduate can apply knowledge and experience in the maintenance of equipment, facilities, and technical systems related to technical physics	P6U_U	P6S_UW
K_U11	The graduate can make a preliminary economic analysis of proposed solutions and engineering actions taken.	P6U_U	P6S_UW
K_U12	The graduate can communicate with the public using specialist terminology in the field of technical physics, can take part in a debate, present and evaluate various opinions and positions and participate in discussions on subjects related to his/her field of study.	P6U_U	P6S_UK
K_U13	The graduate can independently prepare a comprehensive scientific or technical paper (oral and written) based on his/her own research and/or scientific literature and/or patent database.	P6U_U	P6S_UK
K_U14	The graduate can use a foreign language at the B2 level of the Common European Framework of Reference for Languages and use scientific physical literature in a foreign language.	P6U_U	P6S_UK
K_U15	The graduate can learn autonomously, pursues lifelong learning, understands the need for personal development, and is willing to learn continuously.	P6U_U	P6S_UU P6S_UO
K_U16	The graduate can plan and organize his/her work and work both as a team and individually.	P6U_U	P6S_UO
	SOCIAL COMPETENCES	**Kod składnika opisu** **Code**	**Kod składnik opisu** **Code**
K_K01	The graduate is ready to critically refer to the possessed knowledge and acknowledge its importance in solving cognitive and practical problems connected with physics and technical physics**.**	P6U_K	P6S_KK
K_K02	The graduate is aware of the possibility of consulting experts in case of difficulties in solving problems in the field of technical physics.	P6U_K	P6S_KK
K_K03	The graduate is ready to fulfil social obligations, co-organize activities to benefit the social environment, participate in cultural life, benefit from its various forms, and undertake activities to satisfy public interest related to physical and technical sciences**.**	P6U_K	P6S_KO
K_K04	The graduate is ready to think and act in a business manner, applying the acquired knowledge to practical use**.**	P6U_K	P6S_KO
K_K05	The graduate is ready to follow the rules of professional ethics and requires the same from others and takes care of the physicist's achievements and traditions. He/she is aware of the importance of and understands the non-technical aspects and consequences of engineering activities**.**	P6U_K	P6S_KR