Learning outcomes of the programme:

1.	**Field of study**	**Medical Physics**
2.	Academic year of entry	2018/2019 (winter term)
3.	Level of qualifications/degree	first-cycle studies (in engineering)
4.	Degree profile	general academic

Code of the learning outcome of the programme	**Learning outcomes** The graduate:	Codes of the learning outcomes of the areas of education to which the learning outcome of the programme is related
KNOWLEDGE		
KFM_W01	understands the civilisational importance of medical physics as an interdisciplinary science playing an important role in modern medicine	M1_W01, X1A_W01
KFM_W02	knows the basic theorems from selected branches of mathematics	X1A_W01, X1A_W03
KFM_W03	knows the basic laws and formulas of selected branches of physics	X1A_W01, X1A_W03
KFM_W04	has a basic knowledge of the various branches of classical and quantum physics	X1A_W01, X1A_W03
KFM_W05	understands basic physical theories and processes, knows mathematical formalism useful in constructing and analysing physical models	X1A_W01, X1A_W02, X1A_W03
KFM_W06	has a basic knowledge of organic and inorganic chemistry	X1A_W01, X1A_W03
KFM_W07	knows the basics of statistics and data analysis	X1A_W02, X1A_W04
KFM_W09	is familiar with various numerical methods useful in data analysis and measurement result processing	X1A_W04
KFM_W11	knows and understands basic physical phenomena occurring in nature and the methods of their description	X1A_W01, X1A_W03
KFM_W13	knows the basics of medical physics related sciences, i.e. biophysics and biochemistry	M1_W01, X1A_W01
KFM_W14	knows the basics of selected medical sciences, i.e. anatomy with the elements of histology, physiology with cytology, biology with embryology and genetics, and clinical medicine	M1_W02, M1_W03
KFM_W15	is familiar with the issues of public health and medical sociology	M1_W03, M1_W06
KFM_W18	knows the most important issues related to radiation protection, has knowledge of minimising exposure to electromagnetic radiation	M1_W07, X1A_W06
KFM_W19	has a basic knowledge of the interaction of ionizing radiation with the matter; has knowledge of the results and biological effects of ionizing radiation	M1_W01, X1A_W01
KFM_W20	understands the role of treatment planning within the field of their competence	M1_W07
KFM_W22	knows the basic principles of occupational health and safety	X1A_W06
KFM_W25	is familiar with the methods of assessing the state of health in a life-threatening condition and can assess the further risk to the victim under certain first-aid conditions	M1_W03
KFM_W27	has a theoretical basis for intervention in relation to particular age groups of patients	M1_W05
KFM_W28	has a general knowledge of the selected scientific methods and knows the issues characteristic of the discipline of science not related to the programme	
SKILLS		
KFM_U01	is able to clearly present basic physical theories and theorems in speech and writing	X1A_U06, X1A_U08, X1A_U09
KFM_U02	is able to use a mathematical apparatus to solve simple physical problems	X1A_U01, X1A_U02
KFM_U04	is able to explain basic processes occurring in the surrounding environment and processes responsible for diagnostic and therapeutic effects on the grounds of physics	X1A_U01
KFM_U21	has the ability to self-learn, e.g. in order to improve professional competence	X1A_U07
KFM_U22	has the ability to prepare and deliver an oral presentation in their native and English languages, using modern multimedia techniques	M1_U13, X1A_U09
KFM_U23	can prepare a typical written paper on specific medical physics issues	M1_U12, X1A_U08
KFM_U26	is able to take basic diagnostic, prophylactic and therapeutic measures appropriate to the needs of the victim	M1_U05
KFM_U27	has the ability to pose and analyse problems based on the acquired content from the discipline of science not related to the programme	
SOCIAL COMPETENCES		
KFM_K01	knows the limitations of their own knowledge and understands the need for further education	M1_K01, M1_K02, X1A_K01, X1A_K05

KFM_K02	is able to precisely formulate questions in order to deepen their understanding of a given topic or to find missing elements of reasoning	X1A_K01, X1A_K02
KFM_K03	is able to work in a group adopting different roles; understands the division of tasks and the individual's need to fulfil a given task	M1_K04, X1A_K02
KFM_K04	understands the need to work systematically on long-term projects	X1A_K02, X1A_K03
KFM_K06	understands the need for popular presentation of selected achievements of interdisciplinary science (i.e. medical physics) to laymen	X1A_K06
KFM_K07	understands the need to improve professional and personal competences	M1_K01, X1A_K05
KFM_K08	can cooperate with a doctor, medical personnel and a patient	M1_K03, M1_K04, X1A_K02
KFM_K12	is able to listen to a different opinion and discuss the issue in question in a professional manner	M1_K02, M1_K06, X1A_K02, X1A_K03
KFM_K14	is able to identify priorities for the implementation of a task specified by themselves or others	M1_K05
KFM_K15	understands the need for an interdisciplinary approach to solving problems, integrating knowledge from different disciplines and practising self-education to deepen the acquired knowledge	

Code of the learning outcome of the programme	**Learning outcomes leading to the acquisition of engineering competences** The graduate:	Codes of the learning outcomes of the areas of education to which the learning outcome of the programme is related
	KNOWLEDGE	
KFM_W08	knows the basics of computational and programming techniques supporting the work of a physicist and understands their limitations	InzA_W02, X1A_W04
KFM_W10	knows the basic aspects of construction and operation of the equipment used in medical diagnostic processes and therapy	InzA_W01, InzA_W02, InzA_W05, X1A_W05
KFM_W12	knows how basic mechanical and electronic devices function	InzA_W01, InzA_W02, InzA_W05, X1A_W05
KFM_W16	is familiar with selected techniques of modern medicine based on the use of physical methods	InzA_W02, M1_W03
KFM_W17	is familiar with at least one software package at the basic level that is used for data analysis and statistical calculations	InzA_W02, X1A_W04
KFM_W21	knows and understands legal, economic and ethical aspects of scientific and engineering activity of a medical physicist	InzA_W03, M1_W08, X1A_W07
KFM_W23	knows and understands basic concepts and principles of industrial property and copyright protection	InzA_W03, X1A_W08
KFM_W24	has a basic knowledge of management, including quality management and running a business activity	InzA_W04, X1A_W09
KFM_W26	knows the basics of engineering graphics and digital image analysis	InzA_W02, InzA_W05
	SKILLS	
KFM_U03	has the ability to practically use the knowledge of physics, medicine and related sciences	InzA_U01, M1_U02, M1_U05, X1A_U05
KFM_U05	is able to explain the operation of basic medical diagnostic and therapeutic devices based on the laws of physics	InzA_U05, X1A_U01
KFM_U06	can perform simple physical measurements and experiments and analyse their results	InzA_U01, InzA_U02, InzA_U07, X1A_U02, X1A_U03
KFM_U07	can relate the obtained knowledge to practical applications; can use basic medical equipment and devices	InzA_U06, InzA_U07, M1_U02
KFM_U08	is able to perform quantitative analyses and formulate qualitative conclusions resulting from them	InzA_U03, M1_U08, X1A_U02
KFM_U09	is able to use appropriate computer programmes to solve selected issues of physical and medical data analysis	InzA_U01, X1A_U02, X1A_U04
KFM_U10	can use the computer to automate measurements and data acquisition	InzA_U01, InzA_U02, M1_U06
KFM_U11	is able to use the latest diagnostic, therapeutic and equipment-related achievements in health care based on physical and medical knowledge	InzA_U05, InzA_U07, M1_U02, X1A_U01
KFM_U12	has the ability to formulate problems and use (experimental and theoretical) physical research methodology to solve them	InzA_U01, InzA_U07, X1A_U01
KFM_U13	has the ability to organize, perform, register and technically develop diagnostic tests and therapeutic procedures in cooperation with a doctor	InzA_U01, InzA_U06, InzA_U07, M1_U10

KFM_U14	can plan medicine-related engineering activities, particularly, plan diagnostic and therapeutic procedures in accordance with medical indications	InzA_U01, InzA_U03, InzA_U06, M1_U05
KFM_U15	is able to choose the appropriate protection for different types of radiation	InzA_U03, InzA_U05, M1_U05
KFM_U16	is able to prepare documentation related to the realization of an engineering task and prepare a text containing the discussion of its results	InzA_U06, X1A_U05, X1A_U08
KFM_U17	can work individually and in a team; can estimate the time and resources needed to complete a task; can develop and implement a work schedule to ensure that the deadline is met	InzA_U03, InzA_U04, M1_U03, X1A_U02
KFM_U18	can obtain information from literature, databases and other sources; can integrate and interpret information obtained, draw conclusions and formulate and justify opinions	InzA_U05, InzA_U07, M1_U06, X1A_U03, X1A_U07
KFM_U19	has a sufficient command of English (B2 level) e.g. to successfully read the specialist literature and manuals for the equipment	M1_U14, X1A_U10
KFM_U20	is able to clearly present the problem/point of view to the specialist and the layman	InzA_U03, M1_U13, X1A_U06
KFM_U24	has the ability to modify the measurement methods and systems	InzA_U07, InzA_U08
KFM_U25	is able to perceive non-technical aspects, including environmental, economic and legal aspects when formulating and solving engineering tasks	InzA_U03
SOCIAL COMPETENCES		
KFM_K05	understands and appreciates the importance of intellectual honesty in their own and other's actions; acts ethically	InzA_K01, M1_K03, M1_K04
KFM_K09	understands social aspects of applying the acquired knowledge and skills and the related responsibility	InzA_K01, X1A_K06
KFM_K10	correctly identifies and resolves profession-related dilemmas	InzA_K01, M1_K06, X1A_K04
KFM_K11	performs the tasks in a manner that ensures their own and environment's safety, including observance of the principles of work safety	InzA_K01, M1_K07, X1A_K04
KFM_K13	can think and act in terms of entrepreneurship (costs, economic effects, profit and loss account, profitability)	InzA_K02, X1A_K07