



Reģ.Nr.9000068977, Krišsalas iela 6A, Rīga, LV-1048, Latvija
Tālr.:67089999; Fakss:67089710, e-pasts:rtu@rtu.lv, www.rtu.lvwww.rtu.lv

Study programme "Medical Engineering and Medical Physics"

Main attributes

Title	Medical Engineering and Medical Physics
Identification code	MGF0
Education classification code	47527
Level and type	Professional Master Study
Higher education study field	Mechanics and Metal Processing, Heat Power Engineering, Heat Technology, and Mechanical Engineering
Head of the study field	Aldis Balodis
Department responsible	Faculty of Mechanical Engineering, Transport and Aeronautics
Head of the study programme	Jurijs Dehtjars
Professional classification code	2111 27
The type of study programme	Full time
Language	Latvian, English
Accreditation	16.11.2022 - 17.11.2028; Accreditation certificate No 2022/30-A
Variant 1	
Volume (credit points)	40.0
Duration of studies (years)	Full time studies - 1,0
Degree or/and qualification to be obtained	Professional master degree in medical physics / medical physicist
Qualification level to be obtained	The 7th level of European Qualifications Framework (EQF) and Latvian Qualifications Framework (LQF)
Programme prerequisites	Professional bachelor degree in medical physics and professional qualification of medical physical technology engineer or second level professional higher education in the fields of mechanical engineering, electrical science, computer control or computer science, or comparable education
Variant 2	
Volume (credit points)	80.0
Duration of studies (years)	Full time studies - 2,0
Degree or/and qualification to be obtained	Professional master degree in medical physics / medical physicist
Qualification level to be obtained	The 7th level of European Qualifications Framework (EQF) and Latvian Qualifications Framework (LQF); the 7th level of professional qualification
Programme prerequisites	Bachelor degree of natural sciences in physics, chemistry or comparable education

Description

Abstract	<p>Professional Master study programme „Medical Engineering and Physics” trains high level specialists for work at medical institutions, large number of alumni work as medical physicists, specialists, who are responsible for safe and effective use of radiation in medicine, clinical practice with purpose to achieve required results in diagnostics and therapy, have a good knowledge about construction of medical devices, their technical and physical operational principles, utilization condition, safety requirements, perform control of radiation technologies, take the measurements of calibration, establish the medical irradiation plans of patients, perform the control of that procedures, organize and perform dosimetry for patients. The volume of the study programme is 42 credit points of which compulsory subjects constitute 14 credit points, elective part - 2 credit points, practical placement outside the University - 6 credit points, Master Thesis - 20 credit points.</p> <p>The content of compulsory and elective parts comprises studies of novelties in theory and practical applications in the main field of studies - 7 credit points, courses that ensure mastering of the newest achievements in theory and practice, courses on research, design and management - 7 credit points.</p>
Aim	<p>The aim of the study programme is:</p> <ul style="list-style-type: none"> - to prepare socially responsible and qualified high-level specialists with systemic thinking and understanding, whose knowledge, leadership skills and competencies would allow them to work in medical institutions, representations of medical equipment manufacturers and elsewhere; - to provide students with a set of knowledge, skills and competencies in accordance with the knowledge, skills and competence specified in the 7th level of the framework and the professional standard specified in the Latvian classification of education in the field of medical physics.

Tasks	<p>The tasks of the study programme:</p> <ul style="list-style-type: none"> - to ensure comprehensive, continuous higher engineering education and in-depth knowledge and skills in the field of medical engineering and medical physics; - to develop the ability to carry out research work, to promote interaction between students and academic staff in the development of scientific papers and to demonstrate best practices for practical implementation of the obtained results in enterprises of the sector, as well as to publish the obtained scientific results - to develop criticism, analytical and systematic thinking abilities, ability to perform analysis of work results; - to provide students with in-depth and expanded knowledge, to raise awareness of medical physics and nanoengineering, medical engineering-related research, equipment - to provide students with in-depth and expanded knowledge in one of the specialisation directions, to raise awareness of research opportunities, equipment and technologies to be used; - to develop the ability to apply theoretical knowledge in solving problems related to medical engineering and nanotechnologies; - to promote students' interest in further development of professional skills and academic knowledge; - to stimulate students' and graduates' interest in higher level study programmes, lifelong learning, as well as academic and scientific excellence.
Learning outcomes	<p>Graduate of the study programme:</p> <ul style="list-style-type: none"> - is able to demonstrate comprehensive theoretical knowledge in the fields of medicine and nanoengineering, specialized knowledge and understanding of various fundamental issues, discoveries and development trends; - is familiar with the methods and equipment of planning, implementation, processing, analysis and interpretation of scientific research, as well as methods and equipment for programming, modelling of physical processes, understanding their nature and fields of application; - is able to apply knowledge of the issues to be studied, the most current discoveries and development trends in practice and theoretically; - is able to collect, compare and, at the level of their competence, discuss the research results obtained in scientific work, reports, reports and present these results both to specialists in the field and to the general public; - is able to contribute to the creation of new knowledge, the development of research or methods of practical operation.
Final/state examination procedure, assessment	<p>According to RTU Senate decision of 29 January 2001 knowledge is evaluated on a basis of a 10-point scale. Students take tests and exams according to approved study plans of each academic year.</p>
Description of the future employment	<p>Engineer of medical physical technologies designs and develops medical devices and tools; by using knowledge about operating principles of physical and technical equipment, the manufacturing and construction technologies; how to apply the knowledge of physical field effects on biological objects, to organize security measures, participate in medical equipment and system selection, installation, adjustment, repair and use; able to carry out radiation technology planning and monitoring of patient dosimetry, as well as participating in other engineering activities related to radiological procedures and radiation, participate in radiation safety and quality assurance programs in health treatment centres, organized medical equipment and systems, service, monitoring, inspection and testing; manage and organize production, promote new technologies, the technical, physical and economic calculations for medical physical technology in collaboration with medical practitioners to optimize, harmonize medical physics methods of diagnosis and treatment and participate in international projects; evaluate the impact of implementing projects in the field of environment and society, observe professional ethics.</p> <p>Engineer of medical physical technologies can work in health care institutions - hospitals, clinics, health centres, rehabilitation centres, specialized centres, laboratories, and in medical equipment distribution, service, certification, inspection, manufacturing, engineering and research companies.</p>
Special enrollment requirements	<p>English language proficiency equivalent to at least CEFR B2 level.</p>
Opportunity to continue studies	<p>Have the opportunity to continue studies at the doctoral study programmes.</p>

Courses

No	Code	Name	C.p. [1]	C.p. [2]
A		Compulsory Study Courses	7.0	27.0
1	MMK471	Experimental Equipment	4.0	4.0
2	MMK747	Modern Engineering Technologies In Medicine	3.0	3.0
3	MEE410	Anatomy and Physiology		2.0
4	MEE332	Medical Physics		3.0
5	MEE226	Radiation and Environmental Safety in Medicine		3.0
6	MEE413	Physics of Medical Imaging		4.0
7	MEE509	Medical Instrumentation		3.0
8	MEE508	Radiation Therapy Technologies		3.0
9	RRI311	Electronics in Medicine		2.0
B		Compulsory Elective Study Courses	7.0	7.0
B1		Field-Specific Study Courses	7.0	7.0
		<i>Medical physics</i>	<i>7.0</i>	<i>7.0</i>
1	MMK777	Radiation Physics for Medicine	4.0	4.0
2	MEE516	Medical Technology Project Management	3.0	3.0
		<i>Medical nanoengineering</i>	<i>7.0</i>	<i>7.0</i>
1	MEE224	Nanobiomimetics	4.0	4.0
2	MMK701	Project Management for Micro- and Nanotechnologies	3.0	3.0
D		Practical Placement	6.0	26.0
E		Final Examination	20.0	20.0
1	MEE002	Master Thesis	20.0	20.0

K.p.[*] kredītpunkti studiju programmas variantā