RĪGAS TEHNISKĀ UNIVERSITĀTE

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Study programme "Particle Physics and Accelerator Technologies"

Main attributes

Title	Particle Physics and Accelerator Technologies
Identification code	FDD0
Education classification code	51443
Level and type	Doctoral (Third Cycle) Studies
Higher education study field	Physic, Materials Science, Mathematics and Statistics
Head of the study field	Juris Blūms
Department responsible	Doctoral Studies Department
Head of the study programme	Kārlis Dreimanis
Professional classification code	–
The type of study programme	Full time
Language	Latvian, English
Accreditation	13.09.2023 - 14.09.2029; Accreditation certificate No 2023/28-A
Volume (credit points)	192.0
Duration of studies (years)	Full time studies - 4,0
Degree or/and qualification to be obtained	Doctor of science (Ph.D.) in natural sciences or doctor of science (Ph.D.) in engineering and technology / –
Qualification level to be obtained	The 8th level of European Qualifications Framework (EQF) and Latvian Qualifications Framework (LQF)
Programme prerequisites	Second cycle professional higher education (master degree or comparable education) of natural sciences or engineering

Description

Abstract	The overarching goal of the study programme is to prepare world-class specialists in fields of high-energy particle physics, accelerator technologies and other closely related disciplines, such as particle detector technologies and accelerator physics. During their degree the students will acquire a strong understanding of the theory pertaining to their respective study direction, allowing them to successfully perform scientific research in their field of study. Likewise, students will be given the opportunity to acquire and develop their knowledge in skills that are needed for successfully undertaking their scientific activities, such as computing, programming and computer-aided design skills. The focus of the study programme is on scientific research activities, during which students will be able to acquire, develop and hone all the necessary abilities to continue a successful career in research. Students will also be given an opportunity to spend a prolonged time at an appropriate scientific laboratory, such as a long-term attachment (LTA) at CERN.
Aim	The main goals of the study programme are: to prepare world-class researchers for the work in universities and research laboratories, as well as highly-qualified and innovative workforce in general; to offer an otherwise unavailable in Latvia opportunities to study and perform research in high-energy particle physics and accelerator technology development, thus counter-weighting the potential drain of human resources from the country; to grow the scientific capacity in high-energy particle physics and accelerator technology development, as well as the capacity in natural and engineering sciences in general.
Tasks	The tasks of the study programme: - to prepare world-class specialists in high-energy particle physics and accelerator technologies; - to provide students with such experience as to make them a sought-after workforce both in science and in the wider economy; - to strengthen the scientific research community in Latvia and to strengthen the scientific collaboration between Latvia and CERN.
Learning outcomes	The graduates of the study programme: - is able to analyse the obtained knowledge and information, as well as to synthesize new knowledge arising from the analysis of the information gained.; - is able to identify specific, relevant to their research aspects of the information and knowledge gained and to utilize it in their research activities; - is able to individually perform research work, to determine and perform the research activities necessary to obtain the expected scientific results and outcomes and to critically evaluate the quality of the obtained results; - is able to find and utilize additional sources of information and knowledge to further develop their research skills; - is able to collate and present the knowledge and results gained through their research activities; the ability to communicate the importance of said knowledge and results to various audiences; - is able to appropriately use the research results and outcomes of other researchers for furthering their own research work and to gain further knowledge and understanding; - is able to assist and advice other researchers and to provide assistance to the development of their field of research in the country.

Final/state examination procedure, assessment	At the end of their studies, a student will have successfully defended their thesis (dissertation). A doctoral degree is awarded when a doctoral thesis, containing scientific novelty and appropriate scientific data, analysis and results, is successfully submitted and defended by the student in their respective scientific field. The quality of the thesis is evaluated by the State scientific promotion commission, experts from the Latvian Council of Sciences and the promotional council of the respective field of research. The evaluation if performed taking into account the following criteria: is the scientific task finished and contains appropriate scientific novelty and quality; does the thesis contain the use of up-to-date scientific methods and data analysis strategies; if the candidate has authored appropriate scientific publications and if the scientific results have been presented in appropriate scientific conferences. Decision on the award of the degree is taken by an open vote of the promotional council.
Description of the future employment	Graduates of the study programme will be able to work as highly skilled workforce in a plethora of occupations. Graduates will have substantial skills in data analysis, as well as high-level skills in computing, programming and/or computer-aided design. Graduates will be a highly attractive workforce for scientific institutions both domestically and abroad.
Special enrollment requirements	English language proficiency equivalent to at least CEFR B2 level.
Opportunity to continue studies	Lifelong learning and courses for further training.

Courses

No	Code	Name	Credit points
A		**Compulsory Study Courses**	**15.0**
		Common	*7.0*
1	HEP003	Particle Detectors	2.0
2	HEP004	Computing and Programming for Physics	2.0
3	LUK002	Statistical Methods in Data Analysis	2.0
4	LUK001	Radiation Safety	1.0
		High-energy particle physics	*8.0*
1	HEP001	Particle Physics Theory	8.0
		Accelerator technologies	*8.0*
1	HEP700	Accelerator Technologies	8.0
B		**Compulsory Elective Study Courses**	**21.0**
		Common	*13.0*
1	HEP007	Introduction to Particle Physics	2.0
2	LUK003	Mathematics for Particle Physics	4.0
3	LUK004	Relativity and Cosmology	4.0
4	HEP010	Particles for Medical Physics	4.0
5	HEP011	Data Science for Physics	4.0
6	HEP015	Laboratory Exercises in Electronics	3.0
7	HEP013	Introduction to CAD	3.0
		High-energy particle physics	*8.0*
1	HEP700	Accelerator Technologies	8.0
		Accelerator technologies	*8.0*
1	HEP001	Particle Physics Theory	8.0
C		**Free Elective Study Courses**	**6.0**
E		**Final Examination**	**150.0**
1	HEP000	Dissertation / Thesis	150.0
2	LUK000	Dissertation / Thesis	150.0