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Study programme "Mechanical Engineering and Mechanics"

Main attributes

Title	Mechanical Engineering and Mechanics
Identification code	MDC0
Education classification code	51526
Level and type	Doctoral 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	Anita Avišāne
Professional classification code	-
The type of study programme	Full time
Language	Latvian, English
Accreditation	16.11.2022 - 17.11.2028; Accreditation certificate No 2022/30-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 Engineering and Technology / –
Qualification level to be obtained	The 8th level of European Qualifications Framework (EQF) and Latvian Qualifications Framework (LQF)
Programme prerequisites	Master degree of engineering science or comparable education

Description

Abstract	The study courses included in the study program make it possible to prepare experts who have developed the skills and work techniques related to the field of mechanical engineering and mechanics, materials science, medical engineering, nanotechnology or environmental engineering, and energy science to the extent that they are able to critically analyze problems, including in research, using innovative solutions. The study program focuses on a comprehensive and systematic approach, where study courses allow you to gain in-depth knowledge and understanding of the place and role of processes and technologies not only in the development of mechanical engineering and mechanics but also in the development of other current economic sectors.
Aim	The aim of the study programme is to implement higher-level studies that prepare doctors of science who are highly qualified specialists in such fields of engineering and technology as "Mechanical Engineering and Mechanics," "Materials Science," "Medical Engineering" and "Environmental Engineering," and energy" in the sub-sector "Thermal energy" with an understanding of the latest scientific theories and knowledge, systemic thinking and skills for work in engineering and high-tech companies that are able to solve research and innovation tasks, independently put forward research ideas and conduct independent research, to develop a doctoral dissertation that contributes to the expansion of knowledge mechanical engineering and mechanics or materials science, medical engineering, environmental engineering and energy, or nanotechnology.
Tasks	The tasks of the study programme: - to provide an opportunity to carry out independent research work on the chosen topic; - to provide in-depth theoretical knowledge, skills, and attitudes that would enable doctoral students to successfully carry out scientific research in the chosen field of the Study Program, systematize, methodologically analyze practical and experimental observations, linking them with theoretical knowledge, and demonstrate conceptual and analytical skills in scientific theory development; - to prepare high-level specialists who are able to carry out high-quality and internationally significant scientific research using modern research methods, to publish and report the results of them at international conferences, scientific seminars, etc .; - to develop doctoral students' knowledge of technical innovation methods, to introduce new research and engineering system diagnostics methods, to promote the integration of scientific research and modern technology into a single innovative operating environment, to promote research productivity and competitiveness; - to prepare highly qualified scientists for Latvian and foreign universities, scientific institutions, and industry.

Learning outcomes	<p>The graduate of the study programme:</p> <ul style="list-style-type: none"> - acquires an understanding and knowledge of the planning, organization, implementation, and processing of scientific data, - is able to perform independent, critical analysis and evaluation, solve significant research or innovation tasks, independently put forward a research idea and hypothesis, tasks, plan and manage scientific projects; - is able to evaluate and choose appropriate methods for research independently, has gained a new understanding of existing knowledge and its application in practice, implementing a significant amount of original research, part of which is at the level of internationally cited publications, - is able to demonstrate knowledge and understanding of the latest scientific theories and knowledge, masters research methodology, and modern research methods in the relevant scientific or professional field and the interaction of different areas; - is able to promote the technological and social progress of a knowledge-based society in an academic and professional context.
Final/state examination procedure, assessment	<p>The interconnection between the results of the study program and their attainment is ensured by the evaluation of the doctoral thesis in accordance with the regulations of the MK no. 1001 "Procedure and criteria for the awarding (promotion) of a scientific doctorate" by the doctoral council, three reviewers and interested parties participating in defense of the public doctoral thesis.</p>
Description of the future employment	<p>Graduates of the study program can work as highly qualified experts in mechanical engineering, metalworking, woodworking, food production, health care, etc., in companies.</p>
Special enrollment requirements	<p>English language proficiency equivalent to at least CEFR B2 level.</p>
Opportunity to continue studies	<p>...</p>

Courses

No	Code	Name	Credit points
A		Compulsory Study Courses	15.0
1	MTM700	Design and Analysis of Physical and Computer Experiments	5.0
2	MEE200	Scientific Writing	5.0
3	MMM747	Protection, Promotion and Valorisation of Scientific Results	5.0
B		Compulsory Elective Study Courses	21.0
		<i>Manufacturing Technologies</i>	21.0
1	MMM611	Statistical Mechanics of Surfaces	5.0
2	MMM671	Research Workshop in Mechanical Engineering	5.0
3	MMM600	Material Processing Technology and Theory	5.0
4	MMM700	Science of Welding	10.0
5	MMM701	Welding and Related Technologies	11.0
6	MMM999	Wear Process Calculation	6.0
7	MMM777	Intellectual Property and Its Protection Strategy	6.0
8	MMM778	Design of Smart and Green Cutting Tools	6.0
9	MMM779	Design of Technological Processes	6.0
10	MMM678	Additional Chapters of Material Science	6.0
		<i>Applied Mechanics</i>	21.0
1	MTM639	Analytical Mechanics. Advanced Course	10.0
2	MMP649	Variational Principles in Mechanics	10.0
3	MMP638	Nonlinear Oscillations in Nature and Engineering	10.0
4	MMP644	Mechanics of Composite Materials	10.0
5	MMP606	Basics of Continuous Media Mechanics	5.0
6	MMP634	Nonlinear Mechanics of Materials	5.0
7	MMP647	Fracture Mechanics	5.0
8	MTM640	Dynamic Analysis, Optimisation and Synthesis of Machines	5.0
9	MTM641	Multidisciplinary Analysis and Optimization	6.0
		<i>Machine Dynamics and Design</i>	21.0
1	MTH602	Numerical Analysis for Research of Dynamics of Machines (for Master Students)	10.0
2	MTH603	Methods of Experimental Research of Machines	10.0
3	MTM638	Dynamics and Strength of Machines and Mechanisms	10.0
4	MMP635	Automation of Calculation of Construction Durability	10.0
5	MMP634	Nonlinear Mechanics of Materials	5.0
6	MMP606	Basics of Continuous Media Mechanics	5.0
7	MTH604	Computer Aided Analysis of Mechanical Systems	5.0
8	MTM640	Dynamic Analysis, Optimisation and Synthesis of Machines	5.0
9	MTM641	Multidisciplinary Analysis and Optimization	6.0
		<i>Heat Power Engineering and Heat Technology</i>	21.0
1	MSE612	Theoretical aspects of combustion in external fields	10.0
2	MSE611	Methods of Flue Gases Purification	10.0
3	MSE613	Thermodynamics and Statistic Physics	10.0
4	MSE706	Flow Mechanics	6.0
5	MSE618	The Software in Heat Calculations	5.0
		<i>Medical Engineering</i>	21.0
1	MMK861	Contemporary Medical Physics and Technology	7.0
2	MEE400	Spectroscopy	7.0
3	MMK850	Physics of Biomaterials	7.0
4	MMK851	Biological Signal Analysis	7.0
5	MMK801	Micro and Nanotechnologies in Medicine	7.0
		<i>Nanotechnology</i>	21.0
1	MEE400	Spectroscopy	7.0
2	MMK850	Physics of Biomaterials	7.0
3	MEE802	Micro and Nanotechnologies	7.0
4	DSN701	Characterization of Nanomaterials	7.0
5	KNK700	Nanomechanics	7.0
C		Free Elective Study Courses	6.0
E		Final Examination	150.0
1	MSE009	Research Work	150.0
2	MTM009	Research Work	150.0

3	MMM009	Research Work	150.0
4	MMK860	Research Work	150.0