

Programme of International PhD studies in Mechanics

1. Leading university of PhD studies: **Mechanical Engineering Faculty, Lublin University of Technology.**
2. Studies area: Knowledge area: **Technical Science**, Discipline **Mechanics.**
3. Indication of PhD studies form: **International Full-time PhD Studies at Lublin University of Technology.**
4. Duration of PhD studies: **four years PhD Studies 2018-2022.**

I. PhD Study general characteristics

Discipline	Mechanics
Scientific level	PhD studies
Education profile	Academic
Type of study	Full-time Studies
Scientific Degree	International PhD diploma
Education area, Discipline	Technical Science, Mechanics
Duration	Four years PhD studies 2018-2022
Recruitments	Senate resolution of the Lublin University of Technology no. 10/2017/IV February 27, 2017 year.
Part-time Studies fee	No Part-time Study
Similar education programme at the Lublin University of Technology	Mechanical Engineering Faculty of the Lublin University of Technology has defined programs and education profile for the Mechanical Engineering discipline. However, the PhD Mechanics International Course has different program and profile, based mainly on nonlinear dynamics analysis. This course differs significantly from Mechanics Engineering course.

<p>Characteristics of PhD Mechanics graduate. Education characteristics and employment opportunities (typical jobs) and continuing education process.</p>	<p>The graduate of the International PhD Mechanics Study has wide knowledge about nonlinear systems, numerical, analytical and experimental study. A graduate has knowledge about engineering problems. Moreover, he has ability to formulate scientific problems and solve them with use a new and modern research methods. A graduate has ability to prepare a PhD dissertation. A graduate of the International PhD Mechanics Course are prepared to work as an academic teacher and/or researcher.</p>
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II. Expected education effects

<i>Symbol</i>	<i>Code</i>	Description of education profiles effects after graduating :
<i>Knowledge: a graduate knows and understands</i>		
MSD_W1	P8S_WG	A graduate has advanced general knowledge in the Mechanics discipline, covering the latest national and international achievements in this field.
MSD_W2	P8S_WG	A graduate has advanced knowledge about Mechanics, covering the latest national and international achievements, with particular emphasis on research in the nonlinear dynamics.
MSD_W3	P8S_WG	A graduate has advanced knowledge about the method and the methodology of conducting scientific research in the Mechanics discipline, as well as on modern computational tools used during research.
MSD_W4	P8S_WG	A graduate has general knowledge about the modern technology and new education techniques for didactics and teaching methods in higher education school, enabling him to pursue the academic teacher job.
MSD_W5	P8S_WK	A graduate has basic knowledge about legal, organizational, institutional and financial determinants of the functioning of research at national and international level (EU).

<i>Symbol</i>	<i>Code</i>	Description of I education profiles effects after graduating:
Skills: a Graduate can:		
MSD_U1	P8S_UW	Possesses the ability to plan and conduct scientific research which are methodologically proper and based on good theory knowledge in the mechanics or similar discipline.
MSD_U2	P8S_UW	Possesses the ability to use the modern scientific tools and methods (including modeling, experiment and computer simulation) to carry out scientific research in the mechanics discipline.
MSD_U3	P8S_UW	Possesses the ability to prepare, the research proposal and the research projects, and additionally to organize the research; knows the principles and rules of funds getting (national and international), necessary for the scientific research and is able to apply them in practice.
MSD_U4	P8S_UW, P8S_UK	Possesses the ability to disseminate and transfer research results to the economic and social zone.
MSD_U5	P8S_UK	A graduate can teach students at universities and scientific institutions, using the new methods and technologies of education.
MSD_U6	P8S_UK	Possesses the ability to establish international contacts and publish the research results in the proper journals.
MSD_U7	P8S_UK	Possesses the ability to present and defense own scientific achievements, both at national and international forums, using modern multimedia tools.
MSD_U8	P8S_UK	Possesses the ability to use the international language (especially English) to study the foreign literature, make international contacts and public results .
MSD_U9	P8S_UO	Possesses the ability to plan and execute individual and team research projects, including the international environment.
MSD_U10	P8S_UU	A graduate can plan and working alone for his and, others scientific development.

<i>Symbol</i>	<i>Code</i>	Description of I education profiles effects after graduating
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Social competencies: A graduate is ready to:		
MSD_K1	P8S_KK	Make critical evaluation of the academic discipline and own contribution to the discipline, as well as to appreciate knowledge in solving cognitive and practical problems.
MSD_K2	P8S_KO	A graduate has aware of the role of science in everyday life and in the modern society, and is able to understand and appreciates the importance of scientific research for the country's economic development and civilization progress.
MSD_K3	P8S_KO	A graduate is ready to think and act in an entreprising way.
MSD_K4	P8S_KR	A araduate maintains and develops ethos in research environments. Conducts the research independently and respects public ownership of results.

III. Study programme

Number of ECTS points, required for the qualification 34 ECTS

Number of semesters 8

IV. Matrix of education effects for the Mechanics discipline



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	Selected modelling problems of linear and nonlinear systems	Perturbation methods in mechanics	Publication and presentation methodology	Mechanics of modern materials	Mechatronic systems	Perturbation methods in mechanics	Numerical methods in mechanics	Application of FEM in physical systems	Theory of continuous systems	Control of dynamics systems	Analysis and processing of signals	Selected problems of biomechanics.	Optimization of structural components	Algorithms and programming.	Experimental methods in mechanics I	Experimental methods in mechanics II	Development and application of research projects	Mathematical methods of mechanics	Intellectual property rights	Mechanics history	IT tools in scientific research	Marketing strategy, business education and commercialization of intellectual	Didactics of higher education	Ethics in didactics and research.	Doctoral seminar	
MSD_W1	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+		+		+	+					
MSD_W2	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+		+								
MSD_W3	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+			+	+			
MSD_W4		+																					+			+
MSD_W5		+															+					+				+
MSD_U1	+		+	+	+	+	+					+		+	+	+		+		+		+				
MSD_U2		+										+		+								+	+			
MSD_U3																	+		+							
MSD_U4																	+		+			+				+
MSD_U5																				+	+	+	+	+	+	+
MSD_U6		+																								+
MSD_U7		+															+		+			+		+	+	+
MSD_U8		+																				+				+
MSD_U9		+											+				+		+			+				+
MSD_U10		+															+		+			+	+			
MSD_K1		+																		+				+		+



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MSD_K2																		+		+			+		+	+	
MSD_K3		+																	+		+			+			+
MSD_K4		+																		+		+				+	+



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Project POWR.03.02.00-IP.08-00-DOK/16

V. Study programme with the ECTS points designed for the each stage.

Semester I

1. Selected modelling problems of linear and nonlinear systems (2ECTS, 30h, Exam).
2. Perturbation methods in mechanics (1ECTS, 15h).
3. Numerical methods in mechanics (1ECTS, 30h, Exam).
4. Experimental methods in mechanics I (1ECTS, 15h).
5. Doctoral seminar (1ECTS, 15h).

Semester II

1. Publication and presentation methodology. (1ECTS, 15h).
2. Bifurcation and stability of structure (2ECTS, 30h, Exam).
3. Advanced problem of FEM. (1ECTS, 30h, Exam).
4. Experimental methods in mechanics II (1ECTS, 15h).
5. Doctoral seminar (1ECTS, 15h).

Semestrer III

1. Mechatronic systems (2ECTS, 30h, Exam).
2. Mechanics of modern materials (2ECTS, 30h, Exam).
3. Theory of continuous systems (1ECTS, 15h, Exam).
4. Development and application of research projects (1ECTS, 15h).
5. Doctoral seminar (1ECTS, 15h).

Semestrer IV

1. Control of dynamics systems (1ECTS, 15h, Exam).
2. Mathematical methods of mechanics (1ECTS, 15h).
3. Elective Course I (1ECTS, 30h).
4. Doctoral seminar (1ECTS, 15h).

Semester V

1. IT tools in scientific research (2ECTS, 30h).
2. Elective Course II (1ECTS, 30h).
3. Doctoral seminar (1ECTS, 15h).

Semester VI

1. Business strategy in science (2ECTS, 30h).
2. Elective Courses III (1ECTS, 15h).
3. Doctoral seminar (1ECTS, 15h).

Semestr VII

1. Elective Course IV (1ECTS, 5h).
2. Doctoral seminar (1ECTS, 15h).

Semestr VIII

1. Doctoral seminar (1ECTS, 15h).

Elective Courses I

1. Signal processing and analysis .
2. Selected problems of biomechanics.

Elective Courses II



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1. Optimization of structural components.
 2. Algorithms and programming.

Elective Courses III

1. Didactics of higher education
2. Ethics in didactics and research.

Elective Courses IV

1. Intellectual property rights.
2. Mechanics history.

Total points: 34ECTS, 560hours.



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