



## Subject card

Subject name and code	Robotics and Mechatronics Systems, PG_00057477						
Field of study	Automation, Robotics and Control Systems						
Date of commencement of studies	February 2024	Academic year of realisation of subject			2023/2024		
Education level	second-cycle studies	Subject group					
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	1	Language of instruction			Polish		
Semester of study	1	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Katedra Biomechatroniki -> Faculty of Electrical and Control Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Grzegorz Redlarski					
	Teachers	dr inż. Piotr Tojza prof. dr hab. inż. Grzegorz Redlarski					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	15.0	0.0	30
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours		Self-study		SUM
	Number of study hours	30	6.0		14.0		50
Subject objectives	To acquaint students with advanced solutions, methods and algorithms used in the field of robotics and mechatronic systems.						
Learning outcomes	Course outcome		Subject outcome			Method of verification	
	K7_U07		The student has knowledge and skills in the field of robotics and mechatronic systems, necessary to solve basic and advanced technical problems. He can also present the results achieved as a result of teamwork.			[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools	
	K7_K02		The student is able to work in a group, solving the problems necessary to achieve the goal of the team project			[SK2] Assessment of progress of work [SK5] Assessment of ability to solve problems that arise in practice	
	K7_W06		The student has the knowledge and skills necessary to design dedicated solutions in the field of robotics and mechatronic systems.			[SW3] Assessment of knowledge contained in written work and projects	

Subject contents	<ol style="list-style-type: none"> <li>1. Analogies and discrepancies in the field of feedback occurring in technical and medical systems.</li> <li>2. Technical systems supporting the work of a hospital doctor.</li> <li>3. Advanced systems of detection and analysis of non-stationary signals aimed at supporting the work of a clinician.</li> <li>4. Statistical analysis in the field of robotics and mechatronics.</li> <li>5. Wavelet analysis methods - multiplicity and variety of applications.</li> <li>6. Exoskeleton systems - construction and principle of operation - measuring and executive systems.</li> <li>7. Medical and rehabilitation robotics.</li> <li>8. Virtual reality.</li> <li>9. Swarming algorithms, classifiers and testing functions.</li> <li>10. The pairwise comparison method in technical applications based on expert knowledge.</li> <li>11. The influence of EMG fields on living organisms - a case study.</li> </ol>											
Prerequisites and co-requisites	The student has basic knowledge of the basics of robotics and mechatronics.											
Assessment methods and criteria	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;">Subject passing criteria</th> <th style="width: 33%;">Passing threshold</th> <th style="width: 33%;">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td></td> <td>60.0%</td> <td>50.0%</td> </tr> <tr> <td></td> <td>60.0%</td> <td>50.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade		60.0%	50.0%		60.0%	50.0%
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Recommended reading	Basic literature	W. Bolton.: Mechatronics: Electronic Control Systems in Mechanical and Electrical Engineering, 7th edition										
	Supplementary literature	<ol style="list-style-type: none"> <li>1. Gawrysiak M.: Mechatronika i projektowanie mechatroniczne (in Polish), Politechnika Białostocka, Białystok, 1997.</li> <li>2. Giergiel J., Uhl T.: Identyfikacja układów mechatronicznych (in Polish), PWN, Warszawa, 1990.</li> </ol>										
	eResources addresses	<p>Podstawowe</p> <p><a href="https://www.pearson.com/store/p/mechatronics-electronic-control-systems-in-mechanical-and-electrical-engineering/P100001284100">https://www.pearson.com/store/p/mechatronics-electronic-control-systems-in-mechanical-and-electrical-engineering/P100001284100</a> - It's worth reading the material - after you've read the license</p> <p>Adresy na platformie eNauczanie:</p> <p>ROBOTYKA I SYSTEMY MECHATRONIKI [2023/24] - Moodle ID: 35955</p> <p><a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=35955">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=35955</a></p>										

Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"><li>1. Method of eliminating interference from the environment</li><li>2. Classification of results using swarm classifiers</li><li>3. Applications of exoskeletons in military and rehabilitation systems</li><li>4. Test functions - the essence and principle of use</li><li>5. Robotic rehabilitation system - development prospects</li></ol>
Work placement	Not applicable