GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Wearable electronics, PG_00053371						
Field of study	Biomedical Engineering, Biomedical Engineering, Biomedical Engineering						
Date of commencement of studies	February 2025		Academic year of realisation of subject	2025/2026			
Education level	second-cycle studies		Subject group	Optional subject group Specialty subject group Subject group related to scientific research in the field of study			
Mode of study	Full-time studies		Mode of delivery	at the university			
Year of study	1		Language of instruction	Polish			
Semester of study	2		ECTS credits	2.0			
Learning profile	general academic profile		Assessment form	exam			
Conducting unit	Katedra Inżynierii Materiałów Funkcjonalnych WETI -> Faculty of Electronics, Telecommunications and Informatics						
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Piotr Jasiński					
	Teachers	prof. dr hab. inż. Piotr Jasiński					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	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		3.0	17.0		50
Subject objectives	The aim of the course is to familiarize students with intelligent electronic devices that are worn close to and / or on the surface of the skin, where they detect, analyze and transmit information on, i.e.biosignals.						

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<tr><td>Learning outcomes</td><td>
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<tr><th>Course outcome</th><th>Subject outcome</th><th>Method of verification</th></tr>
<tr><td>[K7_U12] is able, to an increased extent, to analyze the operation of components and systems related to the field of study, as well as to measure their parameters and study their technical characteristics, and to plan and carry out experiments related to the field of study, including computer simulations, interpret the obtained results and draw conclusions</td><td>The student is able to analyse in depth the operation of components, circuits and systems of portable electronics, as well as measure their parameters and assess their technical characteristics. He/she is able to plan and carry out experiments related to components of wearable electronics.</td><td>[SU1] Assessment of task fulfilment</td></tr>
<tr><td>[K7_U03] can design, according to required specifications, and make a complex device, facility, system or carry out a process, specific to the field of study, using suitable methods, techniques, tools and materials, following engineering standards and norms, applying technologies specific to the field of study and experience gained in the professional engineering environment</td><td>Can design and prepare a wearable electronics system</td><td>[SU1] Assessment of task fulfilment</td></tr>
<tr><td>[K7_W03] knows and understands, to an increased extent, the construction and operating principles of components and systems related to the field of study, including theories, methods and complex relationships between them and selected specific issues - appropriate for the curriculum</td><td>Knows the principle of operation of wearable sensors and wearable power supply components</td><td>[SW1] Assessment of factual knowledge</td></tr>
<tr><td>[K7_W02] knows and understands, to an increased extent, selected laws of physics and physical phenomena, as well as methods and theories explaining the complex relationships between them, constituting advanced general knowledge in the field of technical sciences related to the field of study</td><td>Knows and understands the structure and operation of wearable electronics components and is able to design a system composed of them</td><td>[SW1] Assessment of factual knowledge</td></tr>
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<tr><td>Subject contents</td><td>Biochemical and chemical wear sensors. Inertial wear sensors. Optical wear sensors. Electronic knitted fabrics and textile fabrics. Flexible electronics: materials, devices and assembly. Power wear electronics and energy management. Collecting energy on the human body: temperature gradient, movement, light, electromagnetic field. Communication technologies in wearable electronics. Antennas. Wearable electronics in sports. Wearable electronics in medical applications.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>lab</td><td>50.0%</td><td>40.0%</td></tr>
<tr><td>exam</td><td>50.0%</td><td>60.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>• Tao, Xiaoming, ed. Wearable electronics and photonics. Elsevier, 2005.
• Kate Hartman, Make: Wearable Electronics: Design, Prototype, and Wear Your Own Interactive Garments, Maker Media, 2014
• Subhas C. Mukhopadhyay, Wearable Electronics Sensors: ForSafe and Healthy Livin, Springer, 2015</td></tr>
<tr><td>Supplementary literature</td><td>Czasopismo Frontiers in Elelectronics - Wearable Elelectronics</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>List and describe power supply systems in the wearable electronics</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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