



## Subject card

Subject name and code	Elektrotechnics and elektronics, PG_00052314						
Field of study	Chemical Technology						
Date of commencement of studies	October 2022	Academic year of realisation of subject				2022/2023	
Education level	first-cycle studies	Subject group				Obligatory subject group 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	1	ECTS credits				2.0	
Learning profile	general academic profile	Assessment form				assessment	
Conducting unit	Department of Physical Chemistry -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Adam Kloskowski				
	Teachers		dr inż. Mateusz Kogut				
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		2.0		18.0	50
Subject objectives	The main aim of the course is to prepare the students to cooperation with other professionals. This need arise from ongoing unification of science and technology. The scientific apparatus used in biotechnology is often automated and required the working knowledge of the properties and function of electronic circuits. The combination of both areas i.e. biochemistry and electronics will allow for the effective planning of experiments and measurements. Additionally, during the course students became familiar with the practical problems of utilization of electric energy.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K6_W10		The student has a basic knowledge of electrical engineering and electronics necessary to cooperate in the design of automation components in technological processes.		[SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge		
	K6_U10		The student can decide which of the elements are needed to automate the processes.		[SU5] Assessment of ability to present the results of task [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information		

Subject contents	<p>The content of the course was selected in the way allowing the students for effective use of the knowledge from the diversified field of science and future cooperation with professionals with electric engineering background. Special attention was paid to the solving of the practical problems.</p> <p>The framework program consist of:</p> <ol style="list-style-type: none"> <li>1. The basic concept of the electric circuits</li> <li>2. Ohm's law and the internal resistance</li> <li>3. How to draw electric circuits</li> <li>4. Voltage and three-phase current</li> <li>5. Work and power</li> <li>6. The basic electronic components - resistors, technical parameters</li> <li>7. Kirchhoff's first and second law</li> <li>8. Capacitors - technical parameters</li> <li>9. Capacitors - differentiator and integrator</li> <li>10. Diodes - basic of semiconductors</li> <li>11. Types of diodes - (rectifying diode, Zener diode, LED, RGB)</li> <li>12. Half-wave rectifier, full-wave rectifier</li> <li>13. Stabilizers (circuits with a capacitor, Zener diode, transistor, monolithic stabilizers)</li> <li>14. Bipolar transistors (operating status and circuits)</li> <li>15. Operating amplifiers</li> <li>16. Digital technology (TTL/CMOS)</li> <li>17. Microcontrollers - basic information</li> <li>18. Piezoelectric elements</li> <li>19. Biosensors</li> <li>20. The measurements and regulation of temperature</li> <li>21. Motors and DC generators, AC motors</li> <li>22. Power controllers</li> <li>23. Transmission of electricity</li> </ol> <p>Laboratory classes include:</p> <ol style="list-style-type: none"> <li>1. Direct current machines</li> <li>2. Measurement of resistance</li> <li>3. Diodes and transistors</li> <li>4. Voltage Rectifiers and stabilizers</li> <li>5. Electrical Measurements of non-electrical quantities</li> <li>6. Digital Integrated Circuits</li> <li>7. Thyristor power regulator</li> </ol>														
Prerequisites and co-requisites	The basic knowledge of mathematics and physics.														
Assessment methods and criteria	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">Subject passing criteria</th> <th style="width: 30%;">Passing threshold</th> <th style="width: 30%;">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td>Lectures - test</td> <td>50.0%</td> <td>60.0%</td> </tr> <tr> <td>Laboratory - test</td> <td>60.0%</td> <td>25.0%</td> </tr> <tr> <td>Laboratory - reports</td> <td>100.0%</td> <td>15.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Lectures - test	50.0%	60.0%	Laboratory - test	60.0%	25.0%	Laboratory - reports	100.0%	15.0%
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Example issues/ example questions/ tasks being completed	What is the voltage drop across a conductive junction diode? At which polarity the diode will be conducting? What happens if we connect the transformer to DC voltage? Give Kirchhoff's first law. Draw the characteristics of the diode $I = f(U)$ . How the three-phase asynchronous motor works. Question about microcontrollers. What is the PWM signal? What can we use it for?
Work placement	Not applicable