



Subject card

Subject name and code	Electronics, PG_00040183						
Field of study	Mechanical Engineering						
Date of commencement of studies	October 2022	Academic year of realisation of subject			2023/2024		
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	2	Language of instruction			English		
Semester of study	4	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Microelectronic Systems -> Faculty of Electronics, Telecommunications and Informatics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Piotr Kurgan				
	Teachers						
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		6.0		14.0	50
Subject objectives	The objective of the course is to introduce a student to the basics of electronics.						
Learning outcomes	Course outcome		Subject outcome			Method of verification	
	K6_U05		Student is able to conduct basic measurements of electrical quantities. Is able to perform computer-aided simulations of analog electronic circuits. Is capable of experimental verification of the operation of analog electronic circuits.			[SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment [SU5] Assessment of ability to present the results of task	
	K6_W10		Student possesses an elementary knowledge on electronics, including basic laws of circuit and signal theory, knows laws of electromagnetism, and knows operation mechanisms and properties of basic semiconductor devices.			[SW1] Assessment of factual knowledge	

Subject contents	<p>1. The phenomenon of the current in electrical circuits. Conductors, isolators, semiconductors and superconductors. Electric current and voltage (potential difference). Ohm's law and Kirchhoff's laws.</p> <p>2. Resistors, voltage and current sources. Powers associated with resistors and sources. Thevenin and Norton equivalent circuits.</p> <p>3. Current, voltage and power waveforms in time and frequency domains. Spectrum of time waveforms.</p> <p>4. LC filters.</p> <p>5. Magnetism.</p> <p>6. DC and AC applications.</p> <p>7. Basics of semiconductor devices.</p>														
Prerequisites and co-requisites															
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="459 752 794 786">Subject passing criteria</th> <th data-bbox="802 752 1137 786">Passing threshold</th> <th data-bbox="1145 752 1469 786">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="459 797 794 842">Lecture - test in the middle of the semester</td> <td data-bbox="802 797 1137 842">50.0%</td> <td data-bbox="1145 797 1469 842">25.0%</td> </tr> <tr> <td data-bbox="459 853 794 898">Lecture - test in the end of the semester</td> <td data-bbox="802 853 1137 898">50.0%</td> <td data-bbox="1145 853 1469 898">25.0%</td> </tr> <tr> <td data-bbox="459 909 794 954">Laboratory - reports from the laboratory tasks</td> <td data-bbox="802 909 1137 954">50.0%</td> <td data-bbox="1145 909 1469 954">50.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Lecture - test in the middle of the semester	50.0%	25.0%	Lecture - test in the end of the semester	50.0%	25.0%	Laboratory - reports from the laboratory tasks	50.0%	50.0%
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Recommended reading	<p>Basic literature</p> <p>Supplementary literature</p> <p>eResources addresses</p>	<p>[1] J.D. Irwin, R. M. Nelms, Basic Engineering Circuit Analysis, John Wiley & Sons Inc., 2011</p> <p>[2] E. Gates, L. Chartrand, Introduction to Electronics, Delmar Cenagage Learning, 2007</p> <p>[1] A. Agawal, J.H. Lang, Foundations of Analog and Digital Electronic Circuits, Elsevier, 2005</p> <p>[2]U. Tietze, C. Schenk, E. Gamm, Electronic Circuits Handbook for Design and Applications, Springer, 2008</p> <p>[3]A.S. Sedra, K.C. Smith, Microelectronic Circuits, Oxford University Press, 2007</p>													
Example issues/ example questions/ tasks being completed	<p>1. Calculate Thevenin and Norton equivalent circuits for a given example.</p> <p>2. Draw and describe frequency characteristic of an LC filter of a given type.</p> <p>3. Describe the construction and operation principle of an AC generator.</p> <p>4. Name and describe Maxwell's equations.</p>														
Work placement	Not applicable														