GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Introduction to electronics and electrotechnics, PG_00051068		
Field of study	Technical Physics		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2027/2028
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study 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	2	Language of instruction	Polish
Semester of study	4	ECTS credits	5.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Institute of Nanotechnology and Materials Engineering -> Faculty of Applied Physics and Mathematics -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Ryszard Barczyński	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	15.0	15.0	0.0	60

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	60	5.0	60.0	125

Subject objectives

The aim of the course is to teach students the basics of electronics and electrical engineering, as well as basic skills in the design and testing of simple electronic circuits.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U06] is able to identify and assess risks, economic efficiency and the applicability of proposed engineering solutions, including critical evaluation taking into account non-technical factors such as ethical aspects.	He or she can estimate the cost of purchasing the components needed to build the designed electronic circuit.	[SU2] Assessment of ability to analyse information
[K6_W06] has knowledge of technical sciences related to physics, including electronics or energy engineering, and understands their application in the design and implementation of technological processes.	He or she knows the basic laws governing electronics. He or she distinguishes between the main types of electronic components.	[SW1] Assessment of factual knowledge
[K6_U05] is able, individually or in a team, to design and construct simple devices, measuring instruments or technical systems using appropriately selected methods, techniques, tools and materials.	He or she can design and test an analog circuit fulfilling a specific function in a simulation environment.	[SU5] Assessment of ability to present the results of task
[K6_U07] is able to solve problems within a team, including interdisciplinary teams, appropriately planning its work.	Working in a team, students can select elements and systems that implement a given task. They can justify their opinion and incorporate conclusions from team discussions.	[SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject

Subject contents

Course content – lecture
1. Basics laws of electricity and electronic components
2. Classification of electronic components
3. Schemes of electronic circuits
4. DC electronic circuits
5. AC electronic circuits
6. Basic passive components (RLC)
7. Active components
8. Semiconductors
9. Diodes
10. Transistors
11. Special semiconductor devices
12. Manufacturing of semiconductor devices
13. Integrated circuits
14. Safe exploitation of electrical devices

Course content – laboratory
1. Studying the properties of passive components.
2. Construction and testing of RLC circuits.
3. Studying the properties of active components.

Course content – project
1. Selection of appropriate systems and components to accomplish a specific task.
2. Prototype development and testing.
3. Documentation of the completed project.

Prerequisites and co-requisites

No prerequisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Report presenting the results of the project	51.0%	15.0%
Test of knowledge about instruments used in testing electrical circuits placed on the e-course (15 min.)	51.0%	5.0%
Cost estimate for the purchase of elements for the construction of the designed electronic circuit	51.0%	5.0%
Assessment of the implementation of laboratory exercises	51.0%	20.0%
Report on the simulation of an electrical circuit	51.0%	5.0%
Final exam (90 min.)	51.0%	50.0%

Recommended reading

Basic literature
1. A. Chwaleba, B. Moeschke, G. Płoszajski, Elektronika, WSiP, Warszawa, 1999.
2. S. Bolkowski, Elektrotechnika, WSiP, Warszawa, 2006.
3. A. Kloskowski, J. Wawer, Ł. Marcinkowski, Podstawy elektrotechniki i elektroniki, Wyd. Politechniki Gdańskiej, Gdańsk, 2015.
4. W. Opydo, Elektrotechnika i elektronika dla studentów wydziałów nieelektrycznych, Wyd. Politechniki Poznańskiej, Poznań, 2005.
5. Materials published on e-nauczanie: https://enauczanie.pg.edu.pl/moodle/course/view.php?id=10797

Supplementary literature
1. P. Hempowicz et al., Elektrotechnika i elektronika dla nieelektryków, WN-T, Warszawa, 1999.
2. P. Horowitz, W. Hill, Sztuka elektroniki 1, WKŁ, Warszawa, 2018.
3. M. Polowczyk, A. Jurewicz, Elektronika dla mechaników, Wyd. Politechniki Gdańskiej, Gdańsk 2002.
4. R. Śledziewski, Elektronika dla fizyków, PWN, Warszawa, 1982.

eResources addresses

Example issues/ example questions/ tasks being completed

1. Describe nad illustrate Kirchhoff's first law.
2. Build an RC low pass filter and determine its cut-off frequency.
3. Design, build and perform tests of a rumble metal detector.

Practical activites within the subject

Not applicable

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