



Subject card

Subject name and code	Electroluminescent diodes, PG_00067893						
Field of study	Technical Physics						
Date of commencement of studies	February 2025		Academic year of realisation of subject		2025/2026		
Education level	second-cycle studies		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		assessment		
Conducting unit	Department of Physics of Electronic Phenomena -> Faculty of Applied Physics and Mathematics -> Wydział Politechniki Gdańskiej						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Waldemar Stampor				
	Teachers		dr hab. inż. Waldemar Stampor				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	0.0	0.0	30
	E-learning hours included: 0.0						
	eNauczanie source address: https://enauczanie.pg.edu.pl/moodle/course/view.php?id=44665						
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	LED basics and design of LEDs						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_K01] knows limitations of own knowledge, understands the need to learn and improve professional and personal competencies		Understands the need to learn and improve their knowledge and skills throughout their life. Their passion inspires others to improve their professional skills		[SK4] Assessment of communication skills, including language correctness		
	[K7_W03] has knowledge of current development paths and discoveries in the scope of physics and related fields of science and technology		Knows: -the physical basis of the electroluminescence, -the structure and principle of operation of EL diodes, -the basic technical parameters of EL diodes, -the similarities and differences between inorganic and organic EL diodes, -the applications and development prospects of EL diodes.		[SW1] Assessment of factual knowledge		

Subject contents	1. Types of luminescence.		
	2. From CRTs to OLEDs, or on modern flat panel TV displays.		
	3. EL diodes - history.		
	4. Recombination of electron-hole pairs. Radiative and non-radiative transitions		
	5. LED basics - electrical properties. p-n junction.		
	6. LED basics - optical properties,		
	7. Light extraction from EL diodes.		
	8. Design of LEDS and technical details.		
	9. EL diodes - photometry and colorimetry.		
	10. Organic light emitting diodes (OLEDs).		
	11. White LEDs.		
	12. EL diodes versus laser diodes..		
Prerequisites and co-requisites	Basic quantum mechanics.		
	Introduction to solid state physics.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	written test	50.0%	100.0%
Recommended reading	Basic literature	1. E.Fred Schubert, Light emitting diodes, Cambridge University Press, Cambridge 2006.	
		2. M. Schwoerer and H.C. Wolf, Organic Molecular Solids, Wiley VCH, Weinheim, 2007, chapter 11.	
	Supplementary literature	1. Jan Kalinowski, Organic light-emitting diodes, Marcel Dekker, New York 2005.	
	eResources addresses		
Example issues/ example questions/ tasks being completed	1. (e-h) pair recombination mechanisms in EL diodes.		
	2. Parameters which determine quantum EL efficiency.		
	3. Types of white light generation in EL diodes.		
Work placement	Not applicable		

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