

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Physics of Dielectric		Code 1010402211010430037
Field of study TECHNICAL PHYSICS	Profile of study (general academic, practical) general academic	Year /Semester 1 / 1
Elective path/specialty -	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: Second-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 2 Classes: - Laboratory: - Project/seminars: -		No. of credits 2
Status of the course in the study program (Basic, major, other) other		(university-wide, from another field) university-wide
Education areas and fields of science and art		ECTS distribution (number and %)
Responsible for subject / lecturer:		
dr hab. Eryk Wolarz email: eryk.wolarz@put.poznan.pl tel. 616653167 Faculty of Technical Physics ul. Nieszawska 13A 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	knowledge of electricity and condensed matter physics in terms of learning outcomes / content program implemented at the first level of education at the Technical Physics field of study
2	Skills	ability to solve basic problems of electricity on the basis of their knowledge, the ability to obtain information from the indicated sources
3	Social competencies	understanding of the need to expand their competences
Assumptions and objectives of the course:		
Acquainting students with the theory, basic properties and applications of dielectrics.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Can apply physical models to describe and analyze processes in dielectrics, and also know restrictions on the use of these models. - [K_W01, K_W02] 2. Has extensive knowledge of the dielectric characterization and their potential applications, knows the current state of knowledge of the dielectric materials, knows dielectric test methods, including the method of dielectric spectroscopy. - [K_W04, K_W10, K_W13]		
Skills:		
1. Can choose dielectric materials for their applications in modern electronics and optoelectronics. - [K_U13]		
Social competencies:		
1. Sees opportunities and ways to continuously update and complement the knowledge of modern technology using dielectric materials - [K_K04]		
Assessment methods of study outcomes		

Effect of education	Type of evaluation	Evaluation criteria	
W01, W02, W04, W10, W13	written/oral exam	3	50.1%-70.0%
		4	70.1%-90.0%
		5	od 90.1%
U013	written/oral exam	3	50.1%-70.0%
		4	70.1%-90.0%
		5	od 90.1%
K04	written/oral exam	3	
		4	
		5	
Course description			
1. Dielectrics in constant electric field. 2. Molecular description of dielectric polarization. 3. Local fields. 4. The phenomena of molecular orientation in dielectrics. 5. Dielectric relaxation and its use. 6. Nonlinear effects in dielectrics. 7. Ferroelectrics, piezoelectrics, pyroelektrics and their application. 8. Preparation, properties and applications of electrets.			
Basic bibliography:			
1. A. Chełkowski, Fizyka dielektryków, PWN, Warszawa, 1993 2. B. Hilczer, J. Małecki, Elektrety i piezopolimery, PWN, Warszawa, 1992 3. C.J.S. Boettcher, Theory of electric polarization, vol. 1 and 2, Elsevier, Amsterdam, 1978			
Additional bibliography:			
1. A.R. von Hippel, Dielektryki i fale, PWN, Warszawa, 1963			
Result of average student's workload			
Activity			Time (working hours)
1. Participation in lectures			30
2. Participation in consultations related to the implementation of the training			2
3. Preparing for exam			30
4. Presence at exam			2
Student's workload			
Source of workload		hours	ECTS
Total workload		64	2
Contact hours		34	1
Practical activities		30	1