

FACULTY OF CHEMISTRY					
SUBJECT CARD					
Name of subject in English:	Organic Electronics				
Main field of study (if applicable):	Chemistry and Engineering of Materials				
Specialization (if applicable):	Advanced Nano and Bio-materials – MONABIPHOT				
Profile:	academic				
Level and form of studies:	2 <sup>nd</sup> level, full-time				
Kind of subject:	obligatory				
Subject code:					
Group of courses:	NO				
	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	15				15
Number of hours of total student workload (CNPS)	60				30
Form of crediting	crediting with grade				crediting with grade
For group of courses mark (X) final course	X				
Number of ECTS points	2				1
including number of ECTS points for practical (P) classes					1
including number of ECTS points for direct teacher-student contact (BK) classes	0,65				0,7
<b>PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES</b> 1. Elemental mathematics: Analysis I and II, algebra 2. Elemental physics: Physics I and II 3. Fundamentals of physical chemistry					
<b>SUBJECT OBJECTIVES</b> To provide students with a general knowledge of: C1 Mechanism of electrical conductivity in organic materials C2 Principles of operation of organic electronic devices C3 Organic electronic materials and fabrication technologies C4 Measurement methods used in characterization of organic electronic devices C5 To gain experience in elaboration and presentation of state of the art knowledge, based on scientific publications					
<b>SUBJECT LEARNING OUTCOMES</b> <b>related to knowledge:</b> PEK_W01 - student knows the types and basic properties of typical organic electronic materials. PEK_W02 - student knows the basics of the description of conductivity and electronic excitation in organic materials PEK_W03 - student knows the principles of operation of diodes, transistors and photovoltaic devices. PEK_W04 - student knows the methods of fabrication and characterization of organic electronic devices <b>related to skills:</b> PEK_U01 student is able to interpret, elaborate and present a range of actual knowledge based on original scientific literature					

<b>PROGRAMME CONTENT</b>		
<b>Lectures</b>		<b>Number of hours</b>
Lec 1	Types and properties of materials used in organic electronics: crystals, polymers, molecules	2
Lec 2	Basic description of phenomena occurring during absorption and emission of radiation	2
Lec 3	Basic description of electrical conductivity in organic materials	2
Lec 4	Fabrication methods: vacuum, solution-based, Langmuir-Blodgett	2
Lec 5	Light emitting diodes - principles of operation and materials	2
Lec 6	Photovoltaic devices - principles of operation and materials	2
Lec 7	Field effect transistors - principles of operation and materials	2
Lec 8	Electronic devices built from single molecules, memories, optoelectronic devices	1
Total hours		<b>15</b>
<b>Seminar</b>		<b>Number of hours</b>
Proj 1 - Proj 7	Student presentations on a selected topic from the field of organic electronics elaborated on the basis of original scientific reports	15
Total hours		<b>15</b>
<b>TEACHING TOOLS USED</b>		
N1. Lecture: traditional lecture or multimedial presentation		
N2. Seminar: students presentations		
<b>EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT</b>		
<b>Evaluation</b> (F – forming (during semester), P – concluding (at semester end))	Learning outcomes number	Way of evaluating learning outcomes achievement
F1	PEK_W01 - PEK_W04	Written essay on the given topic
F2	PEK_U01	Oral presentation
<b>P= (F1+F2)/2</b>		
<b>PRIMARY AND SECONDARY LITERATURE</b>		
<b><u>PRIMARY LITERATURE:</u></b>		
[1] Köhler, A. and Bäessler, H. (2015). Front Matter. In Electronic Processes in Organic Semiconductors (eds A. Köhler and H. Bäessler).		
<b><u>SECONDARY LITERATURE:</u></b>		
[1] Jan Godlewski (2008). Wstęp Do Elektroniki Molekularnej.		
<b>SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)</b>		
<b>dr inż. Krzysztof Janus, Krzysztof.janus@pwr.edu.pl</b>		