

FACULTY of CHEMISTRY					
<b>SUBJECT CARD</b>					
Name of subject in English:	<b>Organic Electronics</b>				
Main field of study (if applicable):	<b>Advanced Nano and Biomaterials - MONABIPHOT</b>				
Specialization (if applicable):					
Profile:	<b>academic</b>				
Level and form of studies:	<b>2<sup>nd</sup> level, full-time</b>				
Kind of subject:	<b>obligatory</b>				
Subject code:	<b>W03ANB-SM2012W, W03ANB-SM2012S</b>				
Group of courses:	<b>NO</b>				
	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	<b>15</b>				<b>15</b>
Number of hours of total student workload (CNPS)	<b>25</b>				<b>25</b>
Form of crediting	<b>crediting with grade</b>	crediting with grade	crediting with grade	crediting with grade	<b>crediting with grade</b>
For group of courses mark (X) final course					
Number of ECTS points	<b>1</b>				<b>1</b>
including number of ECTS points for practical (P) classes					<b>1</b>
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	<b>0,65</b>				<b>0,7</b>

\*delete as applicable

**PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES**

1. Elemental mathematics: Analysis I and II, algebra
2. Elemental physics: Physics I and II
3. Fundamentals of physical chemistry

**SUBJECT OBJECTIVES**

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

**SUBJECT EDUCATIONAL EFFECTS****relating to knowledge:**

PEU\_W01 - student knows the types and basic properties of typical organic electronic materials.

PEU\_W02 - student knows the basics of the description of conductivity and electronic excitation in organic materials  
 PEU\_W03 - student knows the principles of operation of diodes, transistors and photovoltaic devices.  
 PEU\_W04 - student knows the methods of fabrication and characterization of organic electronic devices

**relating to skills:**  
 PEU\_U01 student is able to interpret, elaborate and present a range of actual knowledge based on original scientific literature

related to social competences:

<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

### EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT

<b>Evaluation</b> (F – forming (during semester), P – concluding (at semester end))	Educational effect number	Way of evaluating educational effect achievement
F1	PEU_W01 - PEU_W04	Written essay on the given topic
F2	PEU_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>		