

FACULTY OF ELECTRICAL  
ENGINEERING**SUBJECT CARD**

Name in Polish: **Technologie plazmowe w przemyśle**  
 Name in English: **Plasma technologies in industry**  
 Main field of study (if applicable): **Electrical Engineering**  
 Specialization (if applicable): **Industrial Electrical Engineering**  
 Level and form of studies: **2nd level, part-time**  
 Kind of subject: **optional**  
 Subject code: **ELR051276**  
 Group of courses: **NO**

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU):	22				
Number of hours of total student workload (CNPS):	60				
Form of crediting:	crediting with grade				
For group of courses mark (X) final course:					
Number of ECTS points:	2				
including number of ECTS points for practical (P) classes :					
including number of ECTS points for direct teacher-student contact (BK) classes:	1.40				

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

1. Knows basics of physics.
2. Knows basics of material engineering.

**SUBJECT OBJECTIVES**

- C1. Gaining knowledge of physical bases of production and measurements of plasma parameters.  
 C2. Gaining knowledge of the influence of plasma technological parameters on physical and chemical properties of produced materials, which are essential with the point of view of their uses in electrical engineering area.  
 C3. Gaining knowledge of present directions of electrotechnical material science engineering development area.  
 C4. The practical skills of plasma technical application in the industry.

**SUBJECT LEARNING OUTCOMES***relating to knowledge:*

- PEU\_W01 Knows basic rights and definitions applied in plasmonic technologies. Has wide knowledge of the plasma production technologies.  
 PEU\_W02 Has knowledge of meanings and possibility of modification of materials surface with plasmonic methods.  
 PEU\_W03 Has knowledge about using of magnetron gun for thin-layer technologies.

*relating to skills:**relating to social competences:*

- PEU\_K01 Is aware of responsibility for own work and is ready to subordinate the rules of team work.

**PROGRAMME CONTENT**

<b>Form of classes - lecture</b>		<b>Number of hours:</b>
Lec 1	Information about the subject, requirements and grading system. The basic rights, definitions relating to physics of plasma.	2
Lec 2	The basic rights, definitions relating to physics of plasma.	2
Lec 3	Use of plasmic technologies in the industry.	2
Lec 4	Technological methods of plasma production.	2
Lec 5	Use of plasma in engineering of surface.	2
Lec 6	Plasmic technologies of diamonds, fullerenes and graphene development.	2
Lec 7	Magnetron sputtering devices.	2
Lec 8	Magnetron sputtering devices.	2
Lec 9	The use of the plasma in of AC and DC current ARC devices.	2
Lec 10	Unconventional use of plasma.	2
Lec 11	Unconventional use of plasma. Test.	2
Total hours:		<b>22</b>

**TEACHING TOOLS USED**

- N1. Problematic lecture.  
 N2. Lecture with the use of audio-visual, multimedia technics.  
 N3. The student's own work.

**EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT**

<b>Evaluation</b> <i>F - forming (during semester)</i> <i>P - concluding (at semester end)</i>	<b>Educational effect number</b>	<b>Way of evaluating educational effect achievement</b>
F1(w)	PEU_W01 PEU_W02 PEU_W03 PEU_K01	Test
P(w)	P=F1	

**PRIMARY AND SECONDARY LITERATURE****PRIMARY LITERATURE:**

- [1] Kordus A., Plazma w technice, Wydawnictwo Uczelniane Politechniki Poznańskiej, Poznań, 1973  
 [2] Hering M., Podstawy elektrotermii, WNT 1992  
 [3] Burakowski T., Wierzchoń T., Inżynieria powierzchni, WNT, Warszawa 1995  
 [4] Miernik K., Działanie i budowa magnetronowych urządzeń rozpylających, Radom 1997

**SECONDARY LITERATURE:**

- [1] Posadowski W.M.: Niekonwencjonalne Układy magnetronowe do próżniowego nanoszenia cienkich warstw, Oficyna wydawnicza Politechniki Wrocławskiej, Wrocław (2001),  
 [2] Grill A., Cold plasma in materials fabrication, IEEE PRESS 1994  
 [3] Tracton A. A., Coating materials and surface coatings, CRC Press 2006

**SUBJECT SUPERVISOR**

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