

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, full-time**
 Kind of subject: **optional**
 Subject code: **ELR041213**
 Group of courses: **NO**

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU):	30				
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 EDUCATIONAL EFFECTS*relating to knowledge:*

- PEK_W01 Knows basic rights and definitions applied in plasmonic technologies. Has wide knowledge of the plasma production technologies.
 PEK_W02 Has knowledge of meanings and possibility of modification of materials surface with plasmonic methods.
 PEK_W03 Has knowledge about using of magnetron gun for thin-layer technologies.

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

- PEK_K01 Is aware of responsibility for own work and is ready to subordinate the rules of team work

PROGRAMME CONTENT		
Form of classes - lecture		Number of hours:
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	Use of plasma in engineering of surface.	2
Lec 7	Use of plasma in engineering of surface.	2
Lec 8	Plasmic technologies of diamonds, fullerenes and graphene development.	2
Lec 9	Plasmic technologies of diamonds, fullerenes and graphene development.	2
Lec 10	The use of the plasma in of AC and DC current ARC devices	2
Lec 11	The use of the plasma in of AC and DC current ARC devices	2
Lec 12	Magnetron sputtering devices	2
Lec 13	Magnetron sputtering devices	2
Lec 14	Magnetron sputtering devices	2
Lec 15	Unconventional use of plasma. Test.	2
Total hours:		30

TEACHING TOOLS USED
N1. Problematic lecture
N2. Lecture with the use of audio-visual, multimedia technics
N3. Student's own work

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT		
Evaluation <i>F - forming (during semester)</i> <i>P - concluding (at semester end)</i>	Educational effect number	Way of evaluating educational effect achievement
F1(w)	PEK_W01 PEK_W02 PEK_W03 PEK_K01	F1=written 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 PRESS1994 [3] Tracton A. A., Coating materials and surface coatings, CRC Press 2006

SUBJECT SUPERVISOR
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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
ELR041213 - Plasma technologies in industry
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY **Electrical Engineering**
AND SPECIALIZATION **Industrial Electrical Engineering**

Subject educational effect	Correlation between subject educational effect and educational effects defined for main field of study and specialization (if applicable)	Subject objectives	Programme content	Teaching tool number
PEK_W01	S2ETP_W12	C.1	Lec1 Lec2	N.1 N.2 N.3
PEK_W02	S2ETP_W12	C.2 C.3	Lec3 Lec4 Lec5 Lec6 Lec7 Lec8 Lec9	N.1 N.2 N.3
PEK_W03	S2ETP_W12	C.2 C.3 C.4	Lec10 Lec11 Lec12 Lec13 Lec14 Lec15	N.1 N.2 N.3
PEK_K01	K2ETK_K04	C.1 C.2 C.3 C.4	Lec1 Lec2 Lec3 Lec4 Lec5 Lec6 Lec7 Lec8 Lec9 Lec10 Lec12 Lec13 Lec14 Lec15	N.1 N.2 N.3