

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Static electricity in industry		Code 1010314391010317236
Field of study Electrical Engineering	Profile of study (general academic, practical) (brak)	Year /Semester 5 / 9
Elective path/specialty High Voltage Engineering	Subject offered in: Polish	Course (compulsory, elective) elective
Cycle of study: First-cycle studies	Form of study (full-time, part-time) part-time	
No. of hours Lecture: - Classes: - Laboratory: - Project/seminars: 9		No. of credits 1
Status of the course in the study program (Basic, major, other) (brak)		(university-wide, from another field) (brak)
Education areas and fields of science and art technical sciences Technical sciences		ECTS distribution (number and %) 1 100% 1 100%
Responsible for subject / lecturer: dr inż. Krzysztof Walczak email: krzysztof.walczak@put.poznan.pl tel. 61 665 2797 Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Student has a basic knowledge of high voltage technology, basics of electrical engineering and dielectrics engineering.
2	Skills	Student can independently solve engineering tasks. Is able to elaborate and present the results of their work.
3	Social competencies	Student recognizes the importance of the process of continual learning and individual work.
Assumptions and objectives of the course: Understanding the theoretical and practical aspects of issues related to the occurrence of static electricity. Learning technologies using electrification of materials. Knowledge of methods of reducing static electricity. Getting familiar with the standards relating to the protection against static electricity in the workplace.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. The student knows the mechanisms of static electricity generation in industrial environments and is able to assess the risks arising from them. - [K_W08++, K_W13+]		
2. The student knows the standards and methods to reduce static electricity. - [K_W08++, K_W23++]		
Skills:		
1. The student can choose the protection measures against static electricity in the workplace. - [K_U05++]		
Social competencies:		
1. Students can use the acquired knowledge in an efficient and entrepreneurial way. - [K_K05++]		

Assessment methods of study outcomes
- continuous evaluation, on each course - rewarding skills gain in the range of use of the principles and methods have met during the course, - assessment of knowledge and skills related to the implementation of the project, the assessment of project work effects and its presentation.
Course description

The exercise covers the following topics: Examples of the static electricity generation in industrial environments. Laws of electrostatics. Mechanisms of static electricity generation. Electrification of gases, liquids and solids. Factors affecting the generation of static charges. Measurement and evaluation of material electrification. The use of electrification phenomenon in technological processes and operations - gas scrubbing, applying coatings, electrostatic separation. Static electricity in the power transformer insulation oil. Natural and artificial ways to reduce the phenomenon of static electricity. Electrostatic charge neutralizers - examples of application. Legal status and standards for protection against static electricity in the workplace.

Basic bibliography:

1. Gunter Luttgens, Sylvia Luttgens, Wolfgang Schubert , Static Electricity: Understanding, Controlling, Applying, Wiley, 2017
2. Kuffel E., Zaengl W., Kuffel J., High Voltage Engineering. Fundamentals, Butterworth-Heineman, 2001
3. Gajewski A., Elektryczność statyczna, Instytut Wydawniczy Związków Zawodowych. Warszawa 1987
4. Simorda J., Staroba J., Elektryczność Statyczna w Przemysle, WNT, Warszawa 1970
5. Norma PN-E-05204, Ochrona przed elektrycznością statyczną. Ochrona obiektów, instalacji i urządzeń ? Wymagania.
6. Norma PN-E-05205, Ochrona przed elektrycznością statyczną. Ochrona przed elektrycznością statyczną w produkcji i stosowaniu materiałów wybuchowych ? Wymagania.

Additional bibliography:

1. Loeb L.B., Static Electrification, Springer Verlag, Berlin 1958

Result of average student's workload

Activity	Time (working hours)	
1. Participation in project activities	9	
2. Consultation	3	
3. Preparing for classes	10	
4. Implementation of the project	10	
5. Preparation of project results presentation	2	
6. Presentation of the project results and credit the course	1	
Student's workload		
Source of workload	hours	ECTS
Total workload	35	1
Contact hours	12	1
Practical activities	34	1