STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Static electricity in industry		**1010311371010317236**

Field of study	Profile of study (general academic, practical)	Year /Semester
Electrical Engineering	**(brak)**	**4 / 7**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
High Voltage Engineering	**Polish**	**elective**

Cycle of study:	Form of study (full-time,part-time)
First-cycle studies	**full-time**

No. of hours				No. of credits
Lecture: **-**	Classes: **-**	Laboratory: **-**	Project/seminars: **1**	**2**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
(brak)	**(brak)**

Education areas and fields of science and art	ECTS distribution (number and %)
technical sciences	**2 100%**
Technical sciences	**2 100%**

Responsible for subject / lecturer:

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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 Przemyśle, 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	15
2. Consultation	5
3. Preparing for classes	10
4. Implementation of the project	10
5. Preparation of project results presentation	4
6. Presentation of the project results and credit the course	1

Student's workload

Source of workload	hours	ECTS
Total workload	45	2
Contact hours	21	1
Practical activities	44	1