STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
High voltage insulating systems	**1010311371010311710**

Field of study	Profile of study (general academic, practical)	Year /Semester
Electrical Engineering	**general academic**	**4 / 7**

Elective path/specialty	Subject offered in:	Course (compulsory, elective)
High Voltage Engineering	**Polish**	**obligatory**

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

No. of hours	No. of credits
Lecture: **-** Classes: **-** Laboratory: **30** Project/seminars: **15**	**4**

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

Education areas and fields of science and art	ECTS distribution (number and %)

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	He/she has knowledge in frame of electrical engineering material science and knows fundamental principles related to electrical circuits theory. He/she has fundamental knowledge about high voltage engineering. He/she has knowledge in frame of overvoltage protection of buildings and lines.
2	**Skills**	He/she can build simple electrical system. He/she can make measurements of physical properties related to insulation systems. He/she can make measurements of high voltage using various methods.
3	**Social competencies**	He/she can work and cooperate in group. He/she knows influence of high voltage insulation systems on natural environment.

Assumptions and objectives of the course:

To know fundamental problems related to high voltage insulation systems, used in electric power devices such as insulators, transformers, capacitors, cables and GIS substations.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. He/she has fundamental knowledge related to properties and applications of materials used in high voltage insulation systems. - [K_W23++]
2. He/she has knowledge about physical phenomena occurring in high voltage insulation systems. - [K_W26++]

Skills:

1. He/she can design simple electric power system using proper methods. - [K_U03++]
2. He/she can make specification of simple high voltage insulation system. - [K_U16++]

Social competencies:

1. He/she know the role of own work, and work in team. - [K_K03++]

Assessment methods of study outcomes

Project

? assessment of knowledge and skills show during project,

? assessment of project

laboratories:

? test related to laboratory,

? continuous assessment on each laboratory,

? assessment of laboratory reports.

Course description

Laboratories consists of problems related to high voltage insulation systems, used in electric power systems, such as insulators, transformers, cables, capacitors, GIS substations. Laboratories are related to following problems: the influence of contaminants on electric strength of insulators; voltage breakdown of spare gap; the influence of barriers on electric strength; test of high voltage cable; estimation of work voltage of insulators on the basis of voltage breakdown; capacitors test; analysis of electric field distribution on model of cable.

In frame of project, students design chosen high voltage insulation system (insulator, transformer, capacitor, cable).

Basic bibliography:

1. Insulation systems of electric power devices, praca zbiorowa, Wydawnictwa Naukowo-Techniczne, Warszawa 1978.
2. Knotce S., High voltage substations, Wydawnictwa Naukowo-Techniczne, Warszawa 1976.
3. Jezierski E., Transformers. Podstawy teoretyczne, Wydawnictwa Naukowo-Techniczne, Warszawa 1965.
4. Szczepaniak Cz., AC capacitors, Wydawnictwa Naukowo-Techniczne, Warszawa 1976.

Additional bibliography:

1. Rakowska A., DC cable lines, Wydawnictwo Politechniki Poznańskiej, Poznań 2011.

Result of average student's workload

Activity	Time (working hours)
1. Participation in laboratory.	30
2. Participation in projects.	15
3. Consultations.	20
4. Preparation to the laboratory.	10
5. Preparation of laboratory reports.	10
6. Preparation of the project.	20

Student’s workload

Source of workload	hours	ECTS
Total workload	105	4
Contact hours	65	2
Practical activities	85	4