STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Design of electric network and electric power protection system**		Code **1010315341010316101**
Field of study **Electrical Engineering**	Profile of study (general academic, practical) **(brak)**	Year /Semester **2 / 4**
Elective path/specialty **Power Networks and Electric Power System**	Subject offered in: **Polish**	Course (compulsory, elective) **obligatory**
Cycle of study: **Second-cycle studies**	Form of study (full-time,part-time) **part-time**	
No. of hours Lecture: **-** Classes: **-** Laboratory: **-** Project/seminars: **18**		No. of credits **2**
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 %) **2 100%** **2 100%**

Responsible for subject / lecturer:

mgr inż. Bartosz Olejnik
email: bartosz.olejnik@put.poznan.pl
tel. +48 61 665 2270
Elektryczny
ul. Piotrowo 3a 60-965 Poznań

Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Student has knowledge of the basics of electrical engineering, power engineering and protection devices.
2	**Skills**	Student can calculate maximum power demand, short-circuit currents, can adjust a power transformer/CT/VT, knows the principles of confuration protection settings.
3	**Social competencies**	Student is aware group work.

Assumptions and objectives of the course:

The objective is to acquire the skills to create a project of a segment of the distribution grid including power system protection.

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

Knowledge:

1. Student has an extended knowledge of the structure and principles of operation the power system - [K_W16 ++]
2. Student has knowledge of the capabilities and limitations of the methods used in the computer assisted design in electrical engineering - [K_W18 ++]

Skills:

1. Students can use the known methods and mathematical models - if necessary, modifying them - for the analysis and design of components, equipment and electrical systems - [K_U06 ++]
2. Student can design components, equipment and electrical systems, including the selected economic or performance and, if necessary, adapt existing or develop new methods of design and computer-aided design tools - [K_U12 ++]

Social competencies:

1. The student understands the need for the formulation and inform the public-eg through the mass media-the information and opinions on the developments in the field of electrical engineering; takes pains to give such information and opinions in a widely understood, presenting different points of view - [K_K02 ++]

Assessment methods of study outcomes

- determine the ability to work in a team performing specific tasks in practice,
- rewarding the knowledge necessary to carry out the questions posed in the task area (source texts),
- assessment of knowledge and skills related to the implementation of the practice task,
- assessment of report of the project.

Course description

Determination of the predicted power required of a selected group of recipients. Determination of normal and short-circuit operating conditions states of designed system. Selection of overhead wires or cables. Selection of fuses for LV networks. Selection of transformers and relays for MV and HV networks. Assessment of the impact of the proposed MV line on the earth fault protection installed in other line fields the station. Power system protecion settings (in MV station and in the depths of the network).

Basic bibliography:

1. Hoppel W.: Sieci średnich napięć. Wydawnictwo Naukowe PWN, 2017.
2. KacejkoP., Machowski J. : Zwarcia w sieciach elektroenergetycznych. Podstawy obliczeń. WNT Warszawa, 1993
3. Żydanowicz J. : Elektroenergetyczna automatyka zabezpieczeniowa. Tom I : Podstawy zabezpieczeń elektroenergetycznych. WNT Warszawa, 1979.
4. Żydanowicz J. : Elektroenergetyczna automatyka zabezpieczeniowa. Tom II : Automatyka eliminacyjna. WNT Warszawa, 1985
5. Wiatr J., Orzechowski M.: Poradnik projektanta elektryka. Dom Wydawniczy Medium, 2012

Additional bibliography:

1. Norma N SEP-E-002
2. Website: http://www.studium.zue.pwr.wroc.pl/download/studium/Moce%20szczytowe.pdf
3. Kujszczyk Sz. (red.) Elektroenergetyczne sieci rozdzielcze. Tom II, PWN Warszawa, 1994.
4. Winkler W., Wiszniewski A. : Automatyka zabezpieczeniowa w systemach elektroenergetycznych. WNT Warszawa, 1999
5. Dołęga W., Kobusiński M.: Projektowanie instalacji elektrycznych w obiektach przemysłowych. Oficyna wydawnicza Politechniki Wrocławskiej, 2009
6. Olejnik B., Staszak B.: Nowe rozwiązania w zabezpieczeniach od skutków zwarć doziemnych w sieci SN. Wiadomości Elektrotechniczne, nr 12/2015.

Result of average student's workload

Activity	Time (working hours)
1. Participation in project classes	18
2. Participation in consultation	6
3. Implementation of the project	15

Student's workload

Source of workload	hours	ECTS
Total workload	39	2
Contact hours	24	1
Practical activities	33	2