COURSE DESCRIPTION CARD - SYLLABUS

Course name

Signal processing in measurments and power system protection

Course

Field of study	Year/Semester
Electrical Engineering	2/3
Area of study (specialization)	Profile of study
Networks and power system protection	general academic
Level of study	Course offered in
Second-cycle studies	polish
Form of study	Requirements
full-time	compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
15	15	-0
Tutorials	Projects/seminars	
-0	-0	

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

dr inż. B. Staszak

email: bogdan.staszak@put.poznan.pl

tel. 61 665 2635

Wydział Inżynierii Środowiska i Energetyki

ul. Piotrowo 3a, 60-065 Poznań

Responsible for the course/lecturer:

mgr inż. A. Schott-Szymczak

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tel. 61 665 2581

Wydział Inżynierii Środowiska i Energetyki

ul. Piotrowo 3a, 60-065 Poznań

Prerequisites

Student has knowledge in the field of power engineering, power system protection and decisaion algorithms in power engineering.

Course objective

The aim of the course is to learn the methods of signal processing and the synthesis of measurment and decision algorithms in measurment lines of power system protection.

Course-related learning outcomes

Knowledge

1. Student has expanded knowledge of advanced numerical methods used in issues related to the design of power system protection.

2. Student has expanded knowledge of creating decision algorithms and methods for optimizing the work of power system protection used in power engineering.

3. Student has in-depth theoretical and practical knowledge in the field of interference states and their sources in the power grid. He has knowledge of how to limit the effects of network interference such as phase-to-phase and earth faults.

4. Student knows the general principles of creating and developing forms of individual entrepreneurship as well as protecting industrial property and copyright.

Skills

1. Student is able to assess and compare the design solutions of power system protection due to the given utility and economic criteria.

2. Student can plan the testing process of power system protection layout.

Social competences

1. Student is aware of developing professional achievements and compliance with the principles of professional ethics, fulfilling social obligations, inspiring and organizing activities for the social environment.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture:

- assessment of knowledge at a written exam of a problem nature; credit threshold 50% + 1 point

Laboratories:

- assessment of activity and commitment to performed exercises,

- making an independent report of the exercises carried out.

Programme content

Lecture and laboratory: Processing of analog signals. Transient phenomena in current and voltage transformers. Selected methods of measuring signal analysis and interference identification, analogue filtration, anti-aliasing filtration. Analog-to-digital conversion. Digital filtration, synthesis of recursive (NOI) and non-recursive (SOI) filters. Measurement algorithms of basic criterion quantities. Logical structures of power protection systems.

Teaching methods

Lecture: multimedia presentation with examples illustrating real cases.
Laboratories: multimedia presentation introducing to independent work with signal processing programs, creating filters for signal analysis in software prepared for this purpose.

Bibliography

Basic

1. Musierowicz K., Staszak B.: Technologie informatyczne, cz. I - przetwarzanie sygnałów, Wyd. PP, Poznań, 2010.

2. Szafra J., Wisznieski A.: Algorytmy pomiarowe i decyzyjne cyfrowej automatyki elektroenergetycznej, WNT, Warszawa, 2001.

Additional

1. Wiszniewski A.: Algorytmy pomiarów cyfrowych w automatyce elektroenergetycznej, WNT, Warszawa, 1990.

Breakdown of average student's workload

	Hours	ECTS
Total workload	70	3,0
Classes requiring direct contact with the teacher	40	2,0
Student's own work (literature studies, preparation for laboratory classes, preparation for test) [1]	30	1,0

[1] delete or add other activities as appropriate