COURSE DESCRIPTION CARD - SYLLABUS

Course name
Measurement and decision algorithms in power system protection

Course

Field of study
Electrical Engineering

Year/Semester
2/3

Area of study (specialization)
Networks and power system protection

Profile of study
general academic

Level of study
Second-cycle studies

Course offered in
polish

Form of study
full-time

Requirements
elective

Number of hours

Lecture
15

Laboratory classes
15

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

3

Lecturers

Responsible for the course/lecturer:
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Wydział Elektryczny

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Responsible for the course/lecturer:
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Wydział Inżynierii Środowiska i Energetyki

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Prerequisites

Has knowledge of electrical engineering, electrical power engineering, electrical metrology and computer science. Is able to independently perform calculations for elements of the power grid system. Is aware of the need to supplement specialist knowledge and cooperate in a group.

Course objective

Acquiring extended, specialized knowledge in the field of decision-making algorithms used in power protection and control systems for power systems. Acquiring the ability to use programmable logic solutions in modern digital EAZ systems. Expanding knowledge of the possibilities of computer simulations in the field of testing the effectiveness of EAZ devices.

Course-related learning outcomes

Knowledge

1. Has expanded knowledge in the field of creating optimization and decision algorithms used in EAZ elimination, prevention and restitution

2. Has expanded knowledge in the field of selection of equipment and settings of power protection automation and analysis of their working conditions

3. Has extended knowledge of the use of programmable logic in modern EAZ devices

4. Has expanded theoretical knowledge in the field of modern measurement systems and signal processing for the needs of EAZ devices

Skills

1. Is able to use simulation programs supporting the analysis of EAZ system and systems operation

2. Is able to assess the operating conditions of power protection automation devices and choose the right solutions for EAZ systems

Social competences

Is aware of the social effects of proper use of electricity and the country's energy needs

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture:

- assessment of knowledge and skills demonstrated during the written test

problematic,

- ongoing assessment of each class (rewarding activity and quality of perception).

Laboratory exercises:

- test and rewarding of knowledge necessary to implement the problems posed in a given area of laboratory tasks,

- continuous assessment, during each class - rewarding the increase in the ability to use known principles and methods,

- assessment of knowledge and skills related to the implementation of the exercise task, evaluation of the report of the exercise,

- taking into account the laboratory task in team performance assessment.

Programme content

The program content of the module in the area:

lecture: concerns the deepening of knowledge in the field of decision-making algorithms used in power protection automation and control systems of power systems, expanding the ability to use programmable logic solutions in modern digital EAZ systems, expanding knowledge about the possibilities of computer simulations in the field of testing the effectiveness of preventive, elimination EAZ devices and restitution.

Laboratories: testing and checking the operating conditions of decision-measuring algorithms used in selected EAZ systems using physical models of power network elements and computer modeled systems. Building security algorithms using programmable logic circuits of EAZ digital devices.

Teaching methods

Lecture: Multimedia presentation illustrated with examples on the board.

Laboratory:

- work in teams,

- demonstrations,

- detailed review of reports by the laboratory leader and discussions on comments.

Bibliography

Basic

1. Żydanowicz J. Elektroenergetyczna automatyka zabezpieczeniowa. WNT -Warszawa, tom I (1979), tom II (1985), tom III (1989)

2. Winkler W., Wiszniewski A. Automatyka zabezpieczeniowa w systemach elektroenergetycznych. WNT - Warszawa 1999

3. Lorenc J.: Admitancyjne zabezpieczenia ziemnozwarciowe. Wydawnictwo Politechniki Poznańskiej 2007 .

4. Zilouchian A., Jamshidi M.: Intelligent Control Systems Using Soft Computing Metho-dologies. CRC Press, 2001

5. Musierowicz K., Staszak B.: Technologie informatyczne w elektroenergetyce. Wydawnictwo Politechniki Poznańskiej 2010 .

Additional

1. P. Kacejko, J. Machowski : Zwarcia w sieciach elektroenergetycznych, WNT, Warszawa, 2002r

2. P. Kundur : Power System Stability and Control , McGraw-Hill. Inc., 1993 .

3. Rosołowski E.: Cyfrowe przetwarzanie sygnałów w automatyce elektroenergetycznej. Akademicka Oficyna Wydawnicza EXIT, 2002

4. Articles of magazines "Automatyka Elektroenergetyczna", "Wiadomości Elektrotechniczne"

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	40	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	35	1,0

[1] delete or add other activities as appropriate