COURSE DESCRIPTION CARD - SYLLABUS

Course name

Electric power protection automatics

Course

Field of study

Electrical Engineering

Year/Semester

2/2

Area of study (specialization)

Power Networks and Electric Power Systems 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)

Tutorials

Projects/seminars

Number of credit points

2

Lecturers

Responsible for the course/lecturer:

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Responsible for the course/lecturer:

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Prerequisites

Has knowledge within the scope of fundamentals of electrical engineering, electrical power engineering, electrical metrology and informatics. Is able to carry out calculations of power network alone and to carry out basic measurements of electrical circuits using modern control-measuring apparatus. Has a consciousness of necessity to complete specialist knowledge and to carry out cooperation in group.

Course objective

To acquire specialist knowledge in the range of the work of electric power protection. To acquaint with basic decision measurement algorithms of modern devices EAZ. To acquaint with general principles of EAZ devices designing.

Course-related learning outcomes

Knowledge

1. Has extended knowledge in the field of measurements of electrical quantities and selected non-electrical quantities; has in-depth knowledge of the preparation of the results of the experiment

2. Has in-depth knowledge of the construction and operation of the power system, renewable energy sources and economic and legal issues related to the generation, distribution and processing of electricity

3. Has extended knowledge of creating optimization and decision algorithms used in the power industry

Skills

1. Can use the known methods and mathematical models - if necessary modifying them appropriately - to analyze and design processes, devices and electrical systems

2. Can use the known methods and mathematical models - if necessary modifying them appropriately - to analyze and design processes, devices and electrical systems

Social competences

Is aware of the need to develop professional achievements and observe the rules of professional ethics, fulfill social obligations, inspire and organize 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 and skills demonstrated during the written test problem-related (students can use any teaching materials),

- 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

Lecture:Program substances of the module concern the knowledge in the range of automatics of electric power protection (EAZ). The role of eliminative, preventive and restitution automatics. Basic protection elements and protection systems of generators, lines, transformers and asynchronous engines. Measuring systems in electric power substations. Selectivity and sensitivity operation conditions and logic function while making a decision.

Laboratories: research and checking of EAZ systems using laboratory testers and on physical line models, transformers and generators, testing selected station automation functions.

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, 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 Methodologies. 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. Witold Hoppel: Sieci Średnich napięć, zabezpieczenia elektroenergetyczne i ochrona od porażeń.

5. Articles from magazines "Automatyka Elektroenergetyczna" , "Wiadomości Elektrotechniczne"

Breakdown of average student's workload

	Hours	ECTS
Total workload	55	2,0
Classes requiring direct contact with the teacher	30	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	25	1,0

[1] delete or add other activities as appropriate