POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

pl. M. Skłodowskiej-Curie 5, 60-965 Poznań

COURSE DESCRIPTION CARD - SYLLABUS

Course name

ADVANCED ON-LINE DIAGNOSTICS OF THE POWER TRANSFORMER

Course

Proposed by Discipline	Year/Semester
Environmental engineering, mining and energy	II/3, III/5
Type of studies	Course offered in
Doctoral School	English
Form of study	Requirements
full-time	elective

Number of hours

Lecture	Tutorials	Projects/seminars
4		

Number of credit points

1

Lecturers

Responsible for the course/lecturer:

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Faculty of Environmental Engineering and
Energy
Poznan University of Technology
ul. Piotrowo 3a, 60-965 Poznan, Poland

Responsible for the course/lecturer:

Prerequisites

Knowledge: PhD student should have basic knowledge in the field of electricity generation and transmission as well as high voltage technology.

Skills: PhD student can individually identify, formulate and solve engineering problems using innovative tools.

Social competencies: PhD student recognizes the importance of continuous learning and individual work, is open to exploring new areas of knowledge.

Course objective

Acquaintance with modern on-line diagnostics techniques and assessment of the state of insulation of high-voltage devices on the example of power transformer. Acquisition of processing skills and proper interpretation of measurement data to assess the condition of high voltage equipment.

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Course-related learning outcomes

Knowledge

A PhD student who graduated from doctoral school knows and understands:

1) the key trends for the development of electrical power equipment diagnostics, [P8S_WG/SzD_W02]

2) the relationships that exist between the economic sphere and the commercialization of scientific research results. [P8S_WK/SzD_W07]

Skills

A PhD student who graduated from doctoral school can:

1) use knowledge from various fields of science to create expert systems that allow comprehensive assessment of the state of technical devices, [P8S_UW/SzD_U01]

2) critically analyze and evaluate the results of measurements and analyzes in order to make rational decisions regarding the operation of electrical power equipment. [P8S_UW/SzD_U02]

Social competences

A PhD student who graduated from doctoral school is ready to:

1) critically assess the achievements in the field of modern methods of assessing the state of power engineering devices, [P8S_KK/SzD_K01]

2) initiate actions aimed at making the public aware of the importance of modern methods of online diagnostics for energy security. [P8S_KO/SzD_K05]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

PQF code	Methods for verification of learning outcomes	Assessment criteria
W02, W07	Knowledge assessment based on a written test	Depending on the number of correct answers expressed as a percentage, the student will receive the following grade: 50-59% - 3.0 (E) 60-69% - 3.5 (D) 70-79% - 4.0 (C) 80-89% - 4.5 (B) 90-100% - 5.0 (A)
U01, U02	as above	as above
K01, K05	as above	as above

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Programme content

1. Dissolved Gas in Oil Analysis (The fundamental description of the DGA method, Procedures of method use, Methods of results interpretation, On-line application using DGA method).
2. Partial discharges measurement (Partial discharges measurement rules, On-line, on-site methods used for PD measurement, Interpretation of the PD measurement results, On-line application using different methods of PD measurement).

Teaching methods

Lecture: multimedia presentation including illustrations and examples.

Bibliography

Basic

1. E. Kuffel , W.S. Zaengl, J. Kuffel , High Voltage Engineering. Fundamentals, Second edition, Butterworth-Heinemann, 2000.

2. James H. Harlow , Electric Power Transformer Engineering, 3rd Edition, CRC Press, 2012.

3. Issouf Fofana (Ed.), Power Transformer Diagnostics, Monitoring and Design Features, MDPI, December 2018.

4. Ahmed Abu-Siada Ed), Power Transformer Condition Monitoring and Diagnosis, IET, 2018.

Additional

1. W. Sikorski (Ed), Acoustic emission. Research and applications, INTECH, 2013.

2. W. H. Tang , By (author) Q. H. Wu, Condition Monitoring and Assessment of Power Transformers Using Computational Intelligence, Springer London Ltd , 2011.

Breakdown of average student's workload

	Hours	ECTS
Total workload	25	1,0
Classes requiring direct contact with the teacher	4	0,2
Student's own work (literature studies, preparation for tutorials, project preparation, consultations with the teacher) [1]	21	0,8

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[1] delete or add other activities as appropriate