COURSE DESCRIPTION CARD - SYLLABUS

Course name

Operating and diagnostics in power engineering

Course

Field of study

Power Engineering

Year/Semester

3/6

Area of study (specialization)

- common courses

Profile of study

general academic

Level of study

Second-cycle studies

Course offered in

polish

Form of study

full-time

Requirements

compulsory

Number of hours

Lecture

60

Laboratory classes

30

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

4

Lecturers

Responsible for the course/lecturer:

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Responsible for the course/lecturer:

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Wydział Inżynierii Środowiska i Energetyki

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Prerequisites

Student has fundamental information in frame of technology and power machines used in commercial power engineering, liquid mechanics, and metrology. Student has knowledge in frame of material science, fundamental of electric engineering, and structure of high voltage insulating systems. He/she understands principles of work of machine parts and knows structure of basic electric power devices - steam boiler, steam and gas turbine, heat regenerator, compresor, fan. Student is able to choose proper

materials to high voltage insulating systems. Student has consciousness of necessary of extension their competencies, and to be ready to cooperate in frame of team.

Course objective

Achievement of knowledge of application of correct principles of loading of power devices and machines. Recognition of tasks concerning to detailed structure, loading and diagnosctics of high voltage insulating systems of power devices.

Course-related learning outcomes

Knowledge

1. Student has fundamental knowledge in frame of utility power devices in various state of loading.

2.Student has general knowledge about methods of optimalisation of work of power sources in electric power system.

3. Student has knowledge in frame of detailed structure, loading and diagnostics insulating systems of power devices.

Skills

1. Student is able to formula correct principles of loading of basic power devices.

2. Student is able to utilty principles of correct work of power sources in electric power system. -

3. Student recognise state of loading of power instalation.

Social competences

1. Student has consciousness of influence of power machine technology on natural environment.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture

- grade of knowledge and skills indicated on exams with problem character,

Laboratory classes

- tests verifying needed knowledge to realisation indicated problems in some field of laboratory tasks,

- grade of knowledge and skills related to realisation of laboratory tasks, grade of report

Programme content

Lecture

Basic operational concepts. Principles of operation of devices. Steady state operation of the power unit. Operation of generating devices in transient states caused by failures and disruptions or planned transients. Load changes, shutdowns and power unit start-up. Operation of a power plant in the power system - economic load distribution, selection of a set of generating units. Power plant availability.

Reliability and renewal problems. Repairs, start-ups and shutdowns of basic machines and energy devices. Problems of operation in steady and emergency states of nuclear power units with pressurized water reactors. Diagnostics of basic kinds of failures. Recognotion of possibilities, limitations of diagnostics methods used in high voltage insulating systems of power devices.

Laboratory classes

Simulating the operating states of a 200 MW steam block.

Diagnostics and operational testing of high voltage power equipment.

Teaching methods

Lecture

Lecture with multimedia presentation supplemented with examples given on the board.

Laboratory classes

200 MW power block simulator.

Measurements of device working parameters at the teaching stands.

Bibliography

Basic

1. R.Janiczek: Eksploatacja elektrowni parowych, WNT W-wa 1990

2. Florkowska B., Diagnostyka wysokonapięciowych układów izolacyjnych urządzeń elektroenergetycznych, Wydawnictwa AGH, Kraków, 2009

3. Glinka T., Maszyny elektryczne i transformatory. Podstawy teoretyczne, eksploatacja i diagnostyka, Komel 2015

Additional

1. Gładyś H., Matla R.: Praca elektrowni w systemie elektroenergetycznym. WNT. W-wa 1995

2. Pawlik M., Strzelczyk F.: Elektrownie, WNT W-wa 2012, 2017

3. Gacek Z., Kształtowanie wysokonapięciowych układów izolacyjnych stosowanych w elektroenergetyce, Wydawnictwo Politechniki Śląskiej, Gliwice, 2002

4. Florkowska B. i inni, Mechanizmy, pomiary i analiza wyładowań niezupełnych w diagnostyce układów izolacyjnych wysokiego napięcia, Uczelniane Wydawnictwo Naukowo ? Dydaktyczne AGH, Kraków, 2001

Breakdown of average student's workload

	Hours	ECTS
Total workload	120	4,0
Classes requiring direct contact with the teacher	92	3,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	28	1

[1] delete or add other activities as appropriate