COURSE DESCRIPTION CARD - SYLLABUS

Course name
Numerical modeling of energy systems

Course

Field of study
Power Engineering
Area of study (specialization)
Industrial Thermal Power Engineering
Level of study
Second-cycle studies
Form of study
full-time

Year/Semester
2/3
Profile of study
general academic
Course offered in
polish
Requirements
compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
30	15	
Tutorials	Projects/seminars	

Number of credit points

3

Lecturers

Responsible for the course/lecturer:
dr inż. Damian Joachimiak

Responsible for the course/lecturer:
dr inż. Magda Joachimiak

Prerequisites

Basic knowledge of the basics of thermodynamics, fluid mechanics

The ability of effective self-education in the field related to the chosen field of study

Is aware of the need to expand their competences, readiness to cooperate within a team. Awareness of the need to expand their competences in the field of engineer work.

Course objective

Acquainting with systems working in thermal energy and achieving the ability to develop assumptions necessary for the design or modernization of systems in the area of thermal energy. This applies to devices such as turbines, compressors, heat exchangers. Practical familiarization with modeling work of thermal engines and individual systems in energy systems.

Course-related learning outcomes

Knowledge

Has structured and advanced knowledge on the construction of microprocessor and microcomputer components and principles of construction of complex microprocessor systems used in industry

Student has theoretically well-founded knowledge in the field of power devices diagnostics.

Skills

Is able to obtain information from literature, databases and other properly selected sources; also in English in the field of energy, he can integrate information obtained from many fields, make their interpretation and critical assessment, as well as draw conclusions and formulate and fully justify opinions.

Can use the analytical, simulation and experimental methods as well as mathematical models, if necessary, modify them or develop new methods, techniques and tools for the analysis and design of energy systems and systems.

Social competences

Correctly identifies and resolves dilemmas related to the state's energy security; can think and act in a creative and enterprising way; understands the need to formulate and communicate to the public information and opinions on the achievements of the energy sector and industries related to it; is ready to inspire and organize activities for the social environment and initiate activities for the public interest.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

- Knowledge acquired as part of the lecture is verified by a final exam consisting of 6 to 9 questions with various points depending on their level of difficulty. Passing threshold: 50% of points. Final issues on the basis of which questions are prepared will be sent to students by e-mail using the university e-mail system.

- Skills acquired as part of the laboratory classes are verified on the basis of short input colloquia and reports from classes. Passing threshold: 50% of points. Issues are first discussed on the blackboard and then implemented in groups - practical exercises.

Programme content

Stationary and non-stationary work of flow machines used in thermal energy, heat exchanges in power systems, boilers, condensers. Modeling of steam, gas and combined heat circuits.

Teaching methods

1. Lecture: blackboard with multimedia presentation.

2. Laboratory classes: discussing the theory and assumptions for classes on the board and performing tasks given by the teacher.

Bibliography

Basic

R. Janiczek – Eksploatacja elektrowni parowych, WNT W-wa 1980,

S. Perycz – Turbiny parowe i gazowe, Wyd. Pol. Gdańskiej,1982

T. Chmielniak – Technologie energetyczne, Wyd. Pol. Śląskiej,20044. S. Wiśniewski, Termodynamika Techniczna

S. Wiśniewski, Wymiana ciepła

Additional

T. Chmielniak – Turbiny cieplne, Wyd. Pol. Śląskiej, 2004

Breakdown of average student's workload

	Hours	ECTS
Total workload	78	3,0
Classes requiring direct contact with the teacher	48	2,0
Student's own work: literature studies, preparation for laboratory classes,tutorials,;preparation for exam [1]	30	1,0

[1] delete or add other activities as appropriate