



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Special Purpose Heating Systems

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### Course

Field of study

Environmental Engineering

Area of study (specialization)

Level of study

First-cycle studies

Form of study

part-time

Year/Semester

4 / 7

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

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### Number of hours

Lecture

16

Laboratory classes

Other (e.g. online)

Tutorials

10

Projects/seminars

### Number of credit points

4

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### Lecturers

Responsible for the course/lecturer:

Fabian Cybichowski PhD

Responsible for the course/lecturer:

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### Prerequisites

Knowledge on heat transfer, fluid mechanics and thermal systems operation.



Ability to perform engineering calculations and equipment sizing in basic thermal systems.

Awareness of the need to constantly update and supplement one's knowledge and skills.

### Course objective

Students will acquire basic knowledge in the design of special thermal systems, particularly in industrial installations.

### Course-related learning outcomes

#### Knowledge

Student has basic knowledge of typical thermal systems used in industrial plants.

Student knows calculation methods, design techniques and tools used during design process.

#### Skills

Student can choose the type of heating system appropriate for specific application.

Student can perform the calculation and sizing for piping and other equipment for particular system.

Student is able to devise control algorithm for simple thermal system.

#### Social competences

Awareness of the need to constantly acquire and expand knowledge in order to competently pursue the career in engineering.

Student understands non-technical consequences of engineering activities, including the impact on environment, and is aware of their importance.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: written test on term end.

Tutorials: written test on term end.

### Programme content

The utilisation of steam in engineering.

Steam engineering principles & heat transfer.

Steam boiler room technology.

Steam distribution, condensate recovery, related equipment and ancillaries.

Heat exchangers, related equipment and fittings.

Engineering calculations and selection of basic components of steam systems.

The use of thermal oil in industry.



Fundamentals of thermal oil systems for heating purposes.

Operating principles and specific equipment used in thermal oil system.

Comparison of different heating systems commonly used in industry.

Industrial heat recovery systems.

### Teaching methods

Lecture: multimedia presentation.

Tutorials: multimedia presentation, blackboard exercises.

### Bibliography

Basic

Poradnik GESTRA (Flowserve), wydanie 7 (2010)

Parowe źródła ciepła, Krystyna Mizielińska, Jarosław Olszak, WNT 2012 (platforma IBUK)

Learn about steam, Spirax Sarco (poradnik dostępny na stronie Spirax Sarco)

Odzysk i zagospodarowanie niskotemperaturowego ciepła odpadowego ze spalin wylotowych, Kazimierz Wójs, PWN 2015 (platforma IBUK)

Additional

Tutorials and other learning materials available on equipment manufacturers webpages.

### Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,0
Classes requiring direct contact with the teacher	26	1,0
Student's own work (literature studies, preparation for tutorials, preparation for tests) <sup>1</sup>	74	3,0

<sup>1</sup> delete or add other activities as appropriate