



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Modeling of Heat Processes

Course

Field of study

Industrial and Renewable Energy

Area of study (specialization)

Thermal Engineering and Renewable Energy

Level of study

Second-cycle studies

Form of study

part-time

Year/Semester

2/2

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

Number of hours

Laboratory classes

18

Other (e.g. online)

Lecture

Projects/seminars

Tutorials

Number of credit points

2

Lecturers

Responsible for the course/lecturer:

Dr inż Jędrzej Mosiężny

Responsible for the course/lecturer:

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Faculty of Environmental Engineering
and Energetic ul. Piotrowo 3, 60-965
Poznań

Prerequisites

The student has a basic knowledge of thermodynamics and fluid mechanics, combustion, principals of numerical methods in fluid dynamics



Course objective

Present students with skills in area of numerical methods in heat transfer processes.

Course-related learning outcomes

Knowledge

Has extended knowledge on thermodynamics, combustion and fluid dynamics

Knows and understands the fundamental aspects of development of the energetic industry.

Knows and understands the fundamental aspects of modeling of the industrial energy systems and devices

Skills

Is able to utilize gained knowledge to search and interpret acquired information to solve typical and non-typical problems in modeling of heat processes.

Is able to utilize gained knowledge to adapt existing or create new tools to support solving non-typical problems in heat process modeling.

Is able to form and test hypotheses on simple implementations of industrial energy devices

Social competences

Student is ready to critically assess knowledge and received information

Student is ready to recognize the importance of knowledge in solving cognitive and practical problems and to seek expert opinions in case of difficulties in solving the problems

Student is ready to think and act in an entrepreneurial way

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows: passing the laboratory

Programme content

1. Reminder: numerical methods in fluid dynamics
2. Governing equations, derivation of governing equations to FVM suitable form
3. Steady state thermal analysis
4. Transient thermal analysis
5. Conjugate heat transfer analysis



6. Analysing heat exchangers

Teaching methods

Computer Laboratory

Bibliography

Basic

Teoria procesów przepływowych, cieplnych i dyfuzyjnych, Stefan Jan Kowalski, Wydawnictwo Politechniki Poznańskiej, 1999

Additional

Fundamentals of Heat and Mass Transfer. Frank P. Incropera, David P. DeWitt, Theodore L. Bergman, Adrienne S. Lavine

Thermodynamics. RAO, Y. V. C. Rao

COMPUTATIONAL FLUID DYNAMICS. The Basics with Applications. J.D Anderson

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,0
Classes requiring direct contact with the teacher	20	0,7
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	40	1,3

¹ delete or add other activities as appropriate

