COURSE DESCRIPTION CARD - SYLLABUS

Course name
Modeling of Heat Processess [S2EPiO1-ECiO>MPC]

Course

Field of study
Industrial and Renewable Energy Systems

Year/Semester
1/2

Area of study (specialization)
Thermal and Renewable Energy

Profile of study
general academic

Level of study
second-cycle

Course offered in
polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
0

Laboratory classes
30

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

dr inż. Jędrzej Mosiężny

Lecturers

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 etended knowledge on thermodynamics, combustion and fluid dynamics
knows and understands the fundamental aspects of development of the energetic industry.
knows and unsderstands the fundamental aspects if modeling of the industrial enerdy 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 hiptheses on simple implelentations 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:

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

Programme content

1. Reminder: numerical methods in fluid dynamics
2. Governing equations, derrivation 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	2,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	30	1,00