



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Heat and mass transfer [S1Lot2-SLiPL>WCPiM]

Course

Field of study

Aviation

Year/Semester

3/5

Area of study (specialization)

Aircraft Engines and Airframes

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

full-time

Requirements

elective

Number of hours

Lecture

15

Laboratory classes

15

Other

0

Tutorials

15

Projects/seminars

0

Number of credit points

4,00

Coordinators

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Lecturers

Prerequisites

Basic knowledge of selected heat flow processes in machines and devices heat flow. Ability to describe and calculate complex heat flow processes. The ability to effectively self-educate in a field related to the chosen field of study.

Course objective

Familiarization with complex heat flow processes and energy conservation equations taking into account convection processes that carry out momentum exchange. Learning different methods of describing heat flow processes occurring in the assumed thermal and mechanical energy conversion processes for the purpose of modernization or reconstruction of technological systems in energy-related areas heat, heating and refrigeration. Practical mastery of the ability to describe the implementation effective thermal processes in which heat, momentum and mass transfer occur.

Course-related learning outcomes

Knowledge:

-

Skills:

-

Social competences:

-

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture

continuous assessment in each class, rewarding activity and the quality of perception.

written final exam

Blackboard exercises:

test and rewarding knowledge necessary to implement the given problems in a given area

computational tasks,

continuous assessment in each class - rewarding the increase in use skills

known principles and methods,

assessment of knowledge and skills related to the implementation of the exercise task,

Laboratory exercises:

test and rewarding knowledge necessary to implement the given problems in a given area

laboratory tasks,

assessment of knowledge and skills related to the implementation of the laboratory exercise, assessment of the report

exercise performed.

Programme content

Introduction to methods for describing heat flow processes. Conduction in typical configurations geometric. Dimensional analysis and similarity conditions. Introduction to numerical methods.

Heat convection - differential equation, turbulence models. Convection in closed channels.

Convection flowing around the surface. Convection in gaps. Thermal radiation. Exchange

heat when boiling and condensing. Heat exchangers. Basics of mass diffusion and convection

PART - 66 (THEORY - 22.5 hours, PRACTICE - 11.25 hours)

MODULE 2. PHYSICS

2.3 Thermodynamics

b) Isothermal and adiabatic expansion and compression, engine thermodynamic circulation, constant volume and

constant pressure, refrigeration container and heat pump;

Latent heat of fusion and evaporation, thermal energy, heat of combustion. [2]

Course topics

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Teaching methods

lecture, description, discussion, blackboard exercises, independent practical exercises, laboratories

Bibliography

Basic:

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Additional:

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Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	45	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	55	2,00