HEAT AND MASS TRANSFER PROCESSES IN ENERGY SECTOR

3 ECTS (ELECTIVE)

AGH University of Science and Technology

Course responsible: prof. dr. Andrzej.J.Nowak , SUT

Course overview

The aim of the course is to introduce students to heat and mass transfer problems occurring in energy sector. Emphases are laid on practical and efficient methodologies to determine heat and mass transfer coefficients and then resulting heat and fluxes. Together with fundamental laws analogy between both transport phenomena is underlined.
The course consists of lectures and classes.
Lectures cover: Transient heat conduction problems. Boiling and condensation heat transfer. Fundamentals of thermal radiation. Selected problems of heat exchangers. Fundamentals of mass transfer – analogy between heat and mass transfer, mass diffusion and Fick's law. Mass convection and correlations for mass transfer coefficient. Mass transfer through phase change front. Basic information about absorption.
Problem solving classes are carried out by small group of students. They are instructed assistant professors how heat and mass transfer problems typical for energy sector can be analysed. Then students are expected to undertake the number of small individual projects.

Outcome of the course

After this course the student should be able to

- Calculate of temperature fields and heat fluxes in transient heat conduction.
- Calculate of heat transfer coefficients for boiling and condensations.
- Design of heat exchangers.
- Calculate of radiative heat fluxes in any enclosure.
- Calculate of mass transfer coefficients.
- Analyse of absorption processes and design of absorbers.

Course coordinator & teachers

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