



**FACULTY:** ENVIRONMENTAL ENGINEERING AND ENERGY

**COURSE TITLE:** Engineering Heat Transfer

**Number of contact hours:** 60

**Duration:** 1 semester (fall / spring)

**ECTS credits:** 6

**Programme description:** This course introduces the principal concepts and methods of heat transfer. The objectives of this integrated subject are to develop the fundamental principles and laws of heat transfer and to explore the implications of these principles for system behaviour; to formulate the models necessary to study, analyse and design heat transfer systems through the application of these principles; to develop the problem-solving skills essential to good engineering practice of heat transfer in real-world applications. Topics to be covered include also unsteady heat conduction in one or more dimensions, steady conduction in multidimensional configurations, numerical simulation of conduction; forced convection in laminar and turbulent flows; natural convection in internal and external configurations; heat transfer during condensation and boiling; mass transfer at low rates, evaporation; thermal radiation, black bodies, grey radiation networks, spectral and solar radiation. Problems and examples will emphasize modelling of complex systems drawn from manufacturing, electronics, consumer products, and energy systems.

**Course type:** lectures (15), exercises (15), computer simulations (15), laboratory (15)

**Literature:**

1. Bergman T.L., Lavine A.S., Incropera F.P., DeWitt D.P. *Introduction to Heat Transfer*. Wiley, 2011.
2. Holman J.P. *Heat Transfer*. 10<sup>th</sup> Ed. The McGraw-Hill Companies, Inc., 2010
3. Welty J.R., Wicks C.E., Wilson R.E., Rorrer G.L. *Fundamentals Momentum Heat Mass Transfer*. 5<sup>th</sup> Ed. Wiley, 2008
4. Cengel Y.A. *Heat and Mass Transfer. A Practical Approach*. 2<sup>nd</sup> Ed. Wiley, 2006

**Assessment method:** written assessment and reports from computer simulation and laboratory

**Lecturer:** Jan Taler

**Contact person:** Jan Taler (e-mail: [jan.taler@pk.edu.pl](mailto:jan.taler@pk.edu.pl))