OTTO VON GUERICKE UNIVERSITÄT MAGDEBURG

CHAIR
OF THERMODYNAMICS
AND COMBUSTION

Heat and Mass Transfer

Process Engineering, Environmental and Energy Process Engineering, Industrial Engineering for Chemical and Energy Engineering

Students understand the mechanisms of heat and mass transfer.On this base they can calculate heat and mass transfer coefficients for different fluids and equipment. Simple heat transfer processes can be interpreted with thermal characteristics, the multiplicity of geometric solutions is aware. The understanding of oppositeness of operating and investment costs and the economic interpretation is acquired . Simple evaporation processes can be interpreted with thermal characteristics at even predetermined heat . They learn stability criteria to be observed and applied . Students are able to calculate heat losses of equipment and buildings and judge the impact and the economics of thermal insulation measures. Theycan apply equilibrium equations on transport processes between liquid and gaseous phases and are thus able to participate in modules Thermal Process Technology and Reaction Process Machinery.

1. Types of Heat Transfer (Basic equations for conduction, convection and radiation) , warming of thermally thin bodies and fluids (Newtonian capacity model)
2. Heat transfer in multi-layer walls , heat resistance , impact of heat-isolation and ribs
3. Convection , derivation Nusseltfunktion, laminar and turbulent boundary layers, suffused body (plate, ball, pipes) , flowed through the body (pipes, ducts , hard beds) , temperature-dependent material properties , impact currents (single nozzle, nozzle systems), free convection (boundary layers, nu functions for different geometries)
4. Evaporation (mechanism Nu functions, stability of evaporator cooling operations), condensation (film theory, laminar and turbulent Nu functions)
5. Recuperators (cocurrent, countercurrent and cross-flow), regenerators
6. Types of diffusion (usually, non- equimolar, pore diffusion, Darcy, Knudsen), mass transfer
7. Stationary processes , diffusion through composite walls , catalysts , mass transfer between phases (Henry) , coupli of heat and mass transfer on the example evaporation

Lecture, exercise

Technical Thermodynamics , Fluid Mechanics

- Attendance: 42 hours
- Self-study: 108 hours

examination: 120min, 5 CP

Prof. Dr.-Ing. E. Specht

- E. Specht: Wärme- und Stoffübertragung in der Thermoprozesstechnik, Vulkan-Verlag.
- Baer, Stephan: Wärme- und Stoffübertragung (Springer Verlag)

Please log in

To see all links and download areas, please log in with your university account.

Study

- Advanced Heat and Mass Transfer
- Ansys
- Combustion Technology
- Equipment Technology
- Heat and Mass Transfer
- Industrial Energy Management
- Offers of Bachelor and Master Theses
- Process Engineering of Metals and Ceramics
- Rules for Job and Career
- Thermal Power Plants
- Thermal Processing/ Heat Technology

› **Login...**