Courses in English
Course Description

Department	06 Applied Sciences and Mechatronics
Course title	**Heat and Mass Transfer (Course No. PBR 665)**
Hours per week (SWS)	4
Number of ECTS credits	5
Course objective	The module heat and mass transfer module provides students with an understanding of the heat and mass transport mechanisms occurring in nature and technology. They are able to transfer real diffusion problems to mathematical models and solve them numerically in a one-dimensional case. They are able to analyze and evaluate processes of heat and mass transfer in systems, and to separate important ones from unimportant processes. They are able to classify and evaluate the flow regimes occurring in energy systems. They are able to quantitatively calculate the occurring quantities by means of analytical approximation formulas and by means of the software EES. They are able to transfer the most important energy conversion systems into compact parametric models and solve them numerically. The students are able to evaluate solutions found for a technical problem and make suggestions for improvements. The module lays the foundation for the physical modeling of Turbines, combustion engines, heat pumps, refrigeration, fuel cells
Prerequisites	
Recommended reading	G. Nellis, S. Klein, Heat Transfer, Cambridge 2009 S. Klein, G. Nellis, Thermodynamics, Cambridge 2012
Teaching methods	Classes, group work and exercises/short projects on computer
Assessment methods	Writen exam 90`
Language of instruction	English
Name of lecturer	Prof. Dr. Ney Moreira
Email	ney.moreira@hm.edu
Link	https://t1p.de/newc
Course content	A. Introduction: heat and mass transfer in power engineering, mathematical and programming tools. B. Heat transfer: balance equations for enthalpy and temperature, heat conduction, convection, radiation, steady state and transient heat conduction. C. Flows: Balance equations for momentum, ratios, boundary layer theory, pipe flows. D. Mass transport: kinetic, diffusion, convection. E. Heat and mass transport: coupled systems, convective heat transport, heat transport with phase transformation (boiling, condensing).
Remarks	