Hochschule München University of Applied Sciences

Courses in English
Course Description

Department	05 Technical Systems, Processes and Communication
Course title	**Heat Transformation: Mechanical and Thermal Heat Pumps (Tri-Generation & Solar Cooling)**
Course number	820
Hours per week (SWS)	4
Number of ECTS credits	5
Course objective	Students shall become familiar with thermodynamic processes for cooling and heat pumping driven by heat instead of mechanical work, i.e. sorption chillers and heat pumps as an alternative to mechanical vapour compression systems. In order to understand the potential and limitations of this technology, the characteristics of working media and thermodynamic cycles are discussed. Starting point will be the classical vapour compression cycle. Based on the gained knowledge students will be able to design and assess heat transformation systems for various applications, like Tri-Generation (cooling driven by heat from co-generation systems), Solar Cooling (Heat from solar collectors is the driver for the cooling process), and Space Heating.
Prerequisites	Basics of Thermodynamics
Recommended reading	Alefeld, G., Radermacher, R.,: Heat Conversion Systems, CRC Press, 1994 Herold, K.E., Radermacher, R., Klein, S.A.: Absorption Chillers and Heat Pumps, CRC Press, 1996 Schweigler, C.: Kälte aus Fernwärme, VDI-Verlag, Düsseldorf, 1999
Teaching methods	Lecture and examples (supported by a software for thermodynamic calculations)
Assessment methods	Oral presentation of a model calculation or thematic research. Final Exam (90 minutes, or 20 minutes oral)
Language of instruction	English
Name of lecturer	Prof. Dr. Christian Schweigler
Email	christian.schweigler@hm.edu
Link	
Course content	Heat Transformation: Energy & Exergy Thermodynamic Modeling: Heat transfer, Vapor compression heat pumps Concept of heat-driven cooling Working media: physical properties, application in sorption cycles Working principle of (closed) Absorption and Adsorption chillers and heat pumps Multi-Stage Cycles Hydraulic System & Control Applications: Tri-Generation, Solar Cooling, Heat transformation in industry Energetic and economic evaluation
Remarks	