HOCHSCHULE FURTWANGEN UNIVERSITY HFU

Elective Module

Course

Heat Transfer

Course Code	Workload	Credits/LP	Semester	Frequency of course	Duration
	90 h	3	4+6	Every semester	1 semester

1	Teaching language	Contact hours	Hours of Self-study	Class size
	German	22,5 h	67,5 h	10

2 Learning outcomes

After successful completion of the course, the students are capable to or do…

Knowledge (1):
… know the basic functionality of the Engineering Equation Solver (EES),

Comprehension (2):
… identify and assess the possibilities and limits of EES,
… convert given calculation equations into EES syntax,

Application (3):
… independently create EES software programs for problems in thermodynamics, heat transfer and fluid mechanics,
… operate the EES software, interpret possible error messages and correct the own program code accordingly,
… present calculation results in diagrams or tables,

Analysis (4):
… check calculation results for plausibility and bringing them into question,
… identify optimization potentials and perform optimization calculations,

Synthesis (5):
… modify, extend or redesign thermodynamic cycle processes,

Evaluation (6):
… interpret and validate efficiencies for process evaluation.

3 Content

Thermal Engineering is an internationally established hypernym for the fields of thermodynamics, heat transfer and fluid mechanics. The Engineering Equation Solver (EES) has been developed specifically for teaching purposes in these fields.

Introduction to the use of EES - Examples from fluid mechanics (water jet pump, pressure drop in pipes) - Examples from thermodynamics (vapor pressure curve, entropy generation and efficiencies for irreversible changes of state, Clausius-Rankine process incl. optimization, 2-stage heat pump incl. optimization) - Examples from heat transfer (ε,NTU equations, differential equations).

4	Teaching methods Guided computer lab course
5	Prerequisites Mathematics 1+2; Basics of engineering thermodynamics and heat transfer
6	Methods of assessment EES code for given problem incl. presentation
7	Applicability of course Elective course
8	Lecturer Prof. Dr.-Ing. Rüdiger Kukral
9	Reading list (Core texts and recommended texts) Klein, S.A.; Nellis, G.J.: Mastering EES (Introduction to the Engineering Equation Solver (EES)); available as PDF from Fa. F-Chart Software (https://fchartsoftware.com/ees/mastering-ees.php) Script with application examples and instructions for their processing; available as PDF in the learning platform FELIX