



HÖGSKOLAN I GÄVLE

Applied Thermodynamics and Fluid Mechanics 15 cr

Mekanisk värmeteori och strömningslära 15 hp

Set by Faculty of Engineering and Sustainable Development

Version

Set at

Valid from

6/1/17

HT2017

Level	G2F
Education level	First cycle
Course identifier	ETG508
Credits	15 cr
Main field of study	Energy Systems
Subject group	Energy Technology
Disciplinary domain	Technology 100.0 %

Learning outcomes

After completion of the course the student shall be able to

1. explain the basic concepts of thermodynamics, fluid mechanics and heat transfer
2. perform dimensional analysis
3. define a system and identify the system's interaction with its environment
4. perform calculations for basic thermodynamic processes
5. perform calculations for basic fluid mechanic problems
6. use simplified solution methods in heat transfer
7. explain the link between energy and sustainable development.

Course content

The course contains three parts, thermodynamics, fluid mechanics and heat transfer.

Thermodynamics contains energy and the first law of thermodynamics, thermodynamic system properties, enthalpy and heat capacity, ideal gas, energy and mass balances, entropy and the second law of thermodynamics, temperature scales, basic simple thermodynamic processes, Carnot cycle, efficiency, air/water mixtures and basic problem formulations.

Fluid mechanics contains basic equations within fluid mechanics (continuity equation, Bernoulli equation, etc.), different types of flows (laminar and turbulent flow), pipe flow, measurement and dimensional analysis and internal/external flows.

Heat transfer contains fundamentals of conduction, natural convection, forced convection and radiation. Empirical and practical relations of forced convective heat transfer, analytical solutions of basic heat transfer problems and more complex cases where empirical correlations are used.

Teaching Lectures and exercises

Prerequisites General entry requirements + Mathematics 3c or Mathematics D, Physics 2

Examination Written examinations and assignments

0010 Written examinations (learning outcomes 1-7)
 0020 Home assignment in thermodynamics (learning outcomes 2, 3, 4)
 0030 Home assignment in fluid mechanics (learning outcomes 2, 3, 5)
 0040 Home assignment in heat transfer (learning outcomes 2, 3, 6)

Grade A, B, C, D, E, Fx, F

Other regulations Criteria for final grades are announced by the coordinator or examiner at the start of the course.

Sustainable environment A minor part of the course content deals with sustainable development.

Module			
0010	Written examinations	13.5 cr	Grade: AF
0020	Assignment in thermodynamics	0.5 cr	Grade: UG
0030	Assignment in fluid mechanics	0.5 cr	Grade: UG
0040	Assignment in heat transfer	0.5 cr	Grade: UG