



## COURSE SYLLABUS

# Thermodynamics and Energy Technology, 7.5 credits

*Termodynamik och energiteknik, 7,5 högskolepoäng*

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<b>Course Code:</b>	TTYK10	<b>Education Cycle:</b>	First-cycle level
<b>Confirmed by:</b>	Dean Jun 1, 2020	<b>Disciplinary domain:</b>	Technology
<b>Valid From:</b>	Aug 1, 2020	<b>Subject group:</b>	MT1
<b>Version:</b>	1	<b>Specialised in:</b>	G1F
		<b>Main field of study:</b>	Mechanical Engineering

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### Intended Learning Outcomes (ILO)

After a successful course, the student shall

Knowledge and understanding

- display a knowledge of understanding of basic terms and concepts in thermodynamics.
- display a knowledge of heat transfer phenomena in different media (conduction, convection and radiation).
- show familiarity with applications of thermodynamics and heat transfer, which are required in the advanced courses within the product and manufacturing processes.

Skills and abilities

- demonstrate skills in thermodynamic calculations and perform engineering calculations of the heat energy transfer.
- demonstrate the ability to calculate the criteria for the equilibrium of reactions.

Judgement and approach

- demonstrate the ability to choose a method to evaluate basic heat transfer phenomena.
- demonstrate the ability to apply thermodynamic approach to evaluate energy exchange between different systems.
- demonstrate the ability to explain the phenomena in the manufacturing processes and the daily phenomena with the knowledge in thermodynamics and energy transfer.

### Contents

The course deals with basic theoretical knowledge in thermodynamics, application of thermodynamics and energy technology.

The course contains the following elements:

- Basic and advanced thermodynamics.
- Heat transfer phenomena.
- Calculation examples and laboratory sessions on thermodynamics and heat energy transfer phenomena.

**Type of instruction**

Lectures

Exercises

Laboratory work

The teaching is conducted in English.

**Prerequisites**

General entry requirements and completed courses Mechanics and Strength of Materials 1, 7,5 credits, Linear Algebra (Msc), 7,5 credits, Single Variable Calculus (Msc), 7,5 credits and Multivariable Calculus, 7,5 hp (or the equivalent).

**Examination and grades**

The course is graded 5,4,3 or Fail.

Registration of examination:

Name of the Test	Value	Grading
Laboratory work	2 credits	U/G
Assignments	2 credits	U/G
Written examination <sup>1</sup>	3.5 credits	5/4/3/U

<sup>1</sup> Determines the final grade of the course, which is issued only when all course units have been passed.

**Course literature**

The literature list for the course will be provided one month before the course starts.

Thermodynamics part

T. Matsushita and K. Mukai, Chemical Thermodynamics in Materials Science – From Basics to Practical Applications –, Springer, 2018.

Heat transfer part

A Heat Transfer Textbook, 5th ed

<https://ahtt.mit.edu/>

Additional book:

- O. Beckman, G. Grimvall, B. Kjällerström och T. Sundström, Energilära, Liber, 2005.