



## Course syllabus

Faculty of Technology

Kalmar Maritime Academy

1FT16U Ånga och värmeöverföring, 5 högskolepoäng

Steam and Heat Transfer, 5 credits

### STCW reference

Management level: Annex 1 Section A-III/1, A-III / 2, A- III/6

### Subject Group

Other Subjects within Technology

### Level of classification

First Level

### Progression

G1N

### Date of Ratification

Approved by Faculty of Technology 2019-03-11

The course syllabus is valid from autumn semester 2019

### Prerequisites

General entry requirements and Mathematics 2a / 2b / 2c, Physics 1b1 / 1a or

Mathematics B, Physics A (Field-specific entry requirements 7/A7). Physics A Physics

1b1 / 1a can be replaced by Natural Science 2 or equivalent.

## Objectives

*Knowledge and understanding*

The student is expected to be able to:

- describe and give examples of coating effect in heat transferring equipment
- describe relevant parts of regulations regarding steam and pressure equipment
- describe some applications from the leading edge of research.

*Skills and Abilities*

The student is expected to be able to:

- account for the structure, components and function of steam plants
- account for heat flow through several layers including heat conduction, convection and radiation.
- account for heat transfer with different types of heat exchanger and various heat transfer techniques with heat exchanger
- apply basic steam and heat technical calculation of steam and heating systems and its main components.
- Apply basic calculation in multi-layer heat transfer and various media
- Apply basic radiation
- Apply basic including heat balances

### *Valuation and approach*

The student is expected to be able to:

- evaluate the contamination of heat transfer surfaces from a business-economical perspective

### Content

- Steam and heating systems and their working methods, construction, components, safety equipment and regulations
- Steam installations and its thermodynamic efficiency
- Hot oil system
- Heat transfer through conduction, convection and radiation
- Heat conductivity, heat transfer coefficient and heat transfer coefficient
- Heat flow through several layers as well as cylindrical surfaces
- Isolation; multi-layer walls with air slots and moisture barrier
- Coating on heat transfer surfaces
- Industrial heat exchanger, its properties and applications
- Heat transfer at downstream flow, counter flow and crossflow

### Type of Instruction

Teaching consists of lectures and examinations.

### Examination

The course is assessed with the grades Fail (U), Pass (G) or Pass with Distinction (VG).

To pass the course mark well approved, a written examination is required.

Knowledge control takes place as follows;

- through individual written examinations, assignments and exercise performance

### Course Evaluation

During the course or in close connection to the course, a course evaluation is to be carried out. The result and analysis of the course evaluation are to be communicated to the students who have taken the course and to the students who are to participate in the course the next time it is offered. The course evaluation is carried out anonymously. The compiled report will be filed at the Faculty and at the Kalmar Maritime Academy.

### Required Reading and Additional Study Material

Alvarez, Henrik, *Energy Engineering, Part 1 and 2, chapter 5.3 and 9*. Lund: Student literature. Latest edition. (257 pages)

*Technical Formula Collection*, Maritime College

*Lecture basis*, Maritime College

*Mollier diagram* for water vapor