

SYLLABUS

Heat treatment and Furnace technology 7.5 credits Q0040B

Värmebehandling och ugnsteknik

Course syllabus admitted: Spring 2019 Sp 3 - Spring 2020 Sp 4

**DECISION DATE
2018-11-07**

Heat treatment and Furnace technology 7.5 credits Q0040B

Värmebehandling och ugnsteknik

First cycle, Q0040B

Education level	Grade scale	Subject	Subject group (SCB)
First cycle	G U 3 4 5	Processmetallurgi	Chemical Engineering

Entry requirements

In order to meet the general entry requirements for first cycle studies you must have successfully completed upper secondary education and documented skills in English language and B0011T Basic Material Science or B0014T Basic Material Science or equal course

Selection

The selection is based on 1-165 credits.

Examiner

Esa Vuorinen

Course Aim

After finished course the students will:

- Understand the basic function at different types of furnaces, know what occur inside the furnace during a heat treatment process including the heat transfer to and from the material
- Be able to recommend suitable furnace technology for a heat treatment process defined from the heat treatment
- Be able to choice suitable energy system - gas or electrical - based on the type of heat treatment
- Be able to make basic chemical calculations burning of gas or oil fuel, and simpler calculation for electrical furnaces
- Be able to make an energy balance for a heat treatment furnace and find technical solutions for energy optimizations
- Know the latest development within industrial furnace technology and high efficient low emission burners

Contents

The course treats the bases for heat treatment and furnace technology are used to reach special properties in the steel. Different basic furnace types are discussed, how they are constructed, how the heating is made and why they are made in different applications.

The following technical parts are included in the course:

- Heat transfer in different furnaces
- Heat treatment furnaces including design and important details for the heat treatment processes
- Heating methods for steel in different heat treatment processes
- Burning and burning equipment
- Energy consumption and process efficiency (gas and electrical heated furnaces)
- Methods to improve the yield
- Heat treatment and processcontrol
- The environmental aspects from the heat treatment

Realization

Each course occasion's language and form is stated and appear on the course page on Luleå University of Technology's website.

Lectures combined with laboratory experiments and study trip.

Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided. Written examination 4 credits, laboratory reports 2.5 credits and study trip 1 credit.

Literature. Valid from Spring 2019 Sp 3

Course offered by

Department of Civil, Environmental and Natural Resources Engineering

Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0001	Written exam	G U 3 4 5	4	Mandatory	A14	
0002	Laboratory report	U G#	2.5	Mandatory	A14	
0003	Study trip	U G#	1	Mandatory	A14	

Last revised

by Assistant Director of Undergraduate Studies Eva Gunneriusson, Department of Civil, Environmental and Natural Resources Engineering 2018-11-07

Syllabus established

by Eva Gunneriusson 2014-02-10