

**SYLLABUS**

# **Fuels, Combustion and Gasification Technology 7.5 credits F7010T**

**Bränslen, förbrännings- och förgasningsteknik**

**Course syllabus admitted: Autumn 2023 Sp 1 - Present**

**DECISION DATE  
2022-02-14**

# Fuels, Combustion and Gasification Technology 7.5 credits F7010T

## Bränslen, förbrännings- och förgasningsteknik

### Second cycle, F7010T

Education level	Grade scale	Subject	Subject group (SCB)
Second cycle	G U 3 4 5	Energiteknik	Energy Technology

### Main field of study

Natural Resources Engineering, Chemical Engineering, Mechanical Engineering

## Entry requirements

In-depth knowledge of thermodynamic principles and heat transfer. These are available, for example, in the course Thermodynamics and Heat Transfer F0032T. Good knowledge in English equivalent to English 6.

## Selection

The selection is based on 30-285 credits

## Course Aim

After completing the course, the student can:

- describe the properties of gaseous, liquid and solid fuels
- explain the basic features of equipment used for combustion and gasification
- explain different reaction processes and reasons for deviations from equilibrium
- appreciate the formation of pollutants and the possibility of limiting them by changing the conditions during combustion.

### 2. Skills and Abilities

After completing the course, the student can:

- calculate stoichiometric amount of air and amount of stack gases for different fuels
- calculate the concentrations of reaction products with consideration taken to equilibrium, mass transfer, and kinetics
- calculate the flame length of gaseous fuels
- calculate the combustion time for single fuel particles and -droplets.
- calculate / estimate the formation of the most common pollutants and the ability to limit these by changing the combustion conditions

### 3. Judgement and approach

After completing the course, the student can:

- account for and reflect on the different combustion technologies opportunities and constraints, including environmental consequences
- give an overall account of the design bases and account for design problems for different combustion equipment

## Contents

Extraction, refinement, and upgrading of solid, liquid and gaseous fuels. Gasification and combustion reactions. Stoichiometry. Thermochemistry. Chemical Equilibrium. Chemical reaction kinetics. Equipment used for gasification and combustion. Ignition. Laminar and turbulent flames. Heterogeneous combustion. Generation of pollutants and possibilities to control this by modification of combustion conditions.

## Realization

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

The education consists of lectures and calculation tutorials as well as study visits and lab's.

## 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 and compulsory written lab reports.

## Unauthorized aids during exams and assessments

If a student, by using unauthorized aids, tries to mislead during an exam or when a study performance is to be assessed, disciplinary measures may be taken. The term "unauthorized aids" refers to aids that the teacher has not previously specified as permissible aids and that may assist in solving the examination task. This means that all aids not specified as permissible are prohibited. The Swedish version has interpretative precedence in the event of a conflict.

## Overlap

The course F7010T is equal to MTM135

## Course offered by

Department of Engineering Sciences and Mathematics

## Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0003	Laboratory work	U G#	1	Mandatory	A20	
0004	Written exam	G U 3 4 5	6.5	Mandatory	A21	

## Study guidance

Study guidance for the course is to be found in our learning platform Canvas before the course starts. Students applying for single subject courses get more information in the Welcome letter. You will find the learning platform via My LTU.

## Last revised

by Niklas Lehto, Programme Director 2022-02-14

## Syllabus established

The syllabus was established by the Department of Applied Physics and Mechanical Engineering 2007-02-28, and remains valid from autumn 2007.