

**SYLLABUS**

# **Machining 7.5 credits**

## **B0016T**

**Skärande bearbetning**

**Course syllabus admitted: Spring 2018 Sp 3 - Autumn 2019 Sp 2**

**DECISION DATE**  
**2017-01-17**

# Machining 7.5 credits B0016T

## Skärande bearbetning

### First cycle, B0016T

| Education level | Grade scale | Subject        | Subject group (SCB)  |
|-----------------|-------------|----------------|----------------------|
| First cycle     | G U 3 4 5   | Materialteknik | Materials Technology |

## 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 Course B0014T Basic Material Science

## Selection

The selection is based on 1-165 credits.

## Examiner

Esa Vuorinen

## Course Aim

After completed course the student shall:

- Be able to detail fundamental machining terms.
- Be able to analyse and describe the load relations regarding mechanical, thermal and tribological load.
- Have an understanding and ability to do simpler calculations that describe the connection between load situation, type of hard metal and tool geometry.
- Be able to perform machining tests for specific purposes, such as wear resistance, plastic deformation and fracture behavior of cutting tools or asses work materials machinability in one or more applications.
- Be able to analyze a cutting process in general and suggest methods for development of cutting tools and work material that facilitate improved quality or lowered tooling costs.
- Have knowledge of measuring techniques that are used for measurement of e.g. constant and dynamical cutting forces and tool movements.
- Have knowledge about the current research questions within the field of machining.
- Be able to connect machining theory to each application area respectively, such as turning, milling drilling and sawing.

## Contents

The course treats theories and models for developing and optimizing of cutting systems. The course gives relevant knowledge that can be applied within the whole manufacturing industry, especially where machining make up a central part of adding value. Following moments are a part of the course: production analysis and production development of cutting technology systems based upon financial key figures. Basic cutting vocabulary. Mechanical analysis and modeling, cutting resistance, load functions, variation numbers. Cutting force measurement and development of cutting force gauge. Thermal analysis and modelling of the cutting process. Stress analysis of cutting tools. Tribological analysis of contact surfaces and surface contact conditions in the cutting process. Archards modified wear equation. Chip formation mechanics. Material technology related process dynamics and segment formation. Vibration and instability and process damping. Microgeometries, dynamics and mode- locking of tool movements. Tool properties for different applications.

## Realization

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

Classes, exercises, laboratory work and study visit.

## 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 exam and laboratory work.

## Literature. Valid from Autumn 2016 Sp 1

Ståhl J-E, De Vos P, Metal cutting – Theories in practice, SECO TOOLS, Lund – Fagersta 2014.

## Course offered by

Department of Engineering Sciences and Mathematics

## Items/credits

| Number | Type            | Credits | Grade     |
|--------|-----------------|---------|-----------|
| 0001   | Written exam    | 5.5     | G U 3 4 5 |
| 0002   | Laboratory work | 2       | U G#      |

## Last revised

by HUL Mats Näsström 2017-01-17

## Syllabus established

by Mats Näsström 2016-02-15