MG2110 Advanced Metrology 9.0 credits

Avancerad mätteknik

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

Establishment

Course syllabus for MG2110 valid from Autumn 2019

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Mechanical Engineering

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

After passing the course, the student will be able to:

- account for the role of metrology in the production chain
- interpret and use tolerances based on the standards in Geometrical Product Specification (GPS)
- predict, estimate and account for measurement uncertainties, based on given measurement data and/or the properties of measurement equipment and methods
- select proper measurement equipment and/or measurement methods for a given measurement problem
- review and comment, and orally present papers in the research field of metrology

Course contents

The role of measurement in the production chain will be treated from different aspects such as:

- measurement planning
- influences of the manufacturing method used
- design, tolerances and standards, based on Geometrical Product Specification (GPS)
- computer aided integration of measurement in the production process.

The product properties and how it influences the measurement will be discussed, i.e.:

- geometry and shape: Freeform and simple geometries, coordinate measurement and geometry control
- surface measurement in relation to required function or appearance
- metrology for micro-nano features
- metrology for large scale components

Experience of modern metrology equipment by means of demonstrations and lab exercises in collaboration with instrument suppliers

- Coordinate measurement machines
- Measuring arms
- Laser scanner/tracker
- 3D Digitizer
- Vision system
- Surface profiler
- Confocal and white light interference microscope
- Interferometers

Function and handling of different measurement devices and methods used in the industry will be introduced, mainly mechanical and optical, ranging from traditional to state-of-the-art. Management of measurement data, i.e. how to interpret and present measurement results using statistical methods such as signal and image processing will be treated, along with estimation of measurement uncertainties based on traceable calibration procedures.

Specific prerequisites

Minimum of 45 cr of second cycle courses completed plus
Manufacturing Technology: one of the courses MG1016, MG1026 or MG2104
and
Statistics: one of the courses ML1018, SF1915 eller SF1916

or the equivalent

Examination

- INL1 - Homework Assignments, 6.0 credits, grading scale: A, B, C, D, E, FX, F

- LAB1 - Laboratory Exercises, 3.0 credits, grading scale: P, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

Ethical approach

- All members of a group are responsible for the group's work.

- In any assessment, every student shall honestly disclose any help received and sources used.

- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.