



MG2210 Advanced Metrology

11,5 hp

Advanced Metrology

När kurs inte längre ges har student möjlighet att examineras under ytterligare två läsår.

Fastställande

Kursplan för MG2210 gäller från och med HT09

Betygsskala

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

Utbildningsnivå

Avancerad nivå

Huvudområden

Särskild behörighet

TPRMM

Undervisningsspråk

Undervisningsspråk anges i kurstillfällesinformationen i kurs- och programkatalogen.

Lärandemål

After the course the student

- will have a good understanding of the role of measurement in the production chain, as regards computer aided integration and quality control as well as the restrictions and demands given by different manufacturing techniques.
- will understand the meaning of the three main purposes of measurement, i.e. to control the production process, the product function and the product design, and how to select appropriate measurement quantities and tools for these purposes.
- will have knowledge about different measurement methods and instruments, both traditional and modern that are used in the industry to measure product dimensions, shape and surface structure.
- have ability to handle and interpret measurement data, to estimate measurement uncertainties and to achieve and present traceable measurement results.
- will be able to give examples of current research topics in dimensional metrology

Kursinnehåll

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
- control of the production process, the product function and the product design,
- relation to quality control,
- and 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 deliverers

- Coordinate measurement machine
- Measuring arms
- Laser scanner/tracker
- 3D Digitizer
- Vision system
- Surface profiler
- Atomic force microscope

- Confocal and white light interference microscope
- Interferometers

Different measurement tools and methods used in the industry will be introduced, mainly mechanical and optical, ranging from traditional to state-of-the-art, including handling of the instruments in order to avoid measurement errors. Management of measurement data, i.e. how to interpretate and present measurement results using statistical and other methods such as signal and image processing will be treated along with estimation of measurement uncertainties based on traceable calibration procedures. The course will be a mixture of lectures, lab and written exercises.

Examination

- INL1 - Inlämningsuppgift, 5,0 hp, betygsskala: P, F
- TEN1 - Tentamen, 6,5 hp, betygsskala: A, B, C, D, E, FX, F

Examinator beslutar, baserat på rekommendation från KTH:s handläggare av stöd till studenter med funktionsnedsättning, om eventuell anpassad examination för studenter med dokumenterad, varaktig funktionsnedsättning.

Examinator får medge annan examinationsform vid omexamination av enstaka studenter.

INL 1, 5hp

TEN 1, 6.5 hp

Etiskt förhållningssätt

- Vid grupparbete har alla i gruppen ansvar för gruppens arbete.
- Vid examination ska varje student ärligt redovisa hjälp som erhållits och källor som använts.
- Vid muntlig examination ska varje student kunna redogöra för hela uppgiften och hela lösningen.