ML2306 Industrial Analytics for Advanced Manufacturing 6.0 credits

Industriell analys för avancerad tillverkning

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

Establishment

Course syllabus for ML2306 valid from Autumn 2019

Grading scale

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

Education cycle

Second cycle

Main field of study

Mechanical Engineering

Specific prerequisites

Completed course ML1503 Industrial systems II, 6 credits or the equivalent.

Completed course Bachelor thesis, 15 credits or the equivalent.

Language of instruction

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

Intended learning outcomes

On completion of the course, the students should be able to:

- Describe the basic concepts in operational safety, condition based maintenance and capability of machines.
- Describe the basic design and work principles for advanced production equipment such as machine tools and industrial robots.
- Explain the relation between capability of advanced production equipment and system performance.
- Explain the importance of testing and categorisation of advanced production equipment.
- Explain the basic work principles for sensors and systems: e g accelerometer, inclinometer and velocity gyroscope; and data collection systems.
- Use a combination of sensors, measuring instruments, statistical data analysis and signal processing to assess the condition and capability of the equipment.
- Use information from scientific articles and international standards for problem solving.

Course contents

Development towards intelligent factories is based on products and production resources such as machines, robots and tools have embedded ability to communicate, perform self diagnosis, become autodidactic and have the possibility to perform automatic adjustments, adaptations and optimisations. In other words, products and processes are intended to become more intelligent and autonomous.

The course deals with advanced production, with a focus on intelligent production equipment and metrology as integrated parts of production systems for manufacturing of components. The course contains a review of industrial robots and machine tools, their configurations, sub-systems, design and operational ability. The course also includes characterisation, simulation, supervision, methods for diagnostics and prognostics of machines, as well as tools for identification of improvement possibilities.

The course aim to teach students about how to acquire and apply new knowledge through three primary learning activities: design, carry out and document individual research. The aim will be achieved through several teaching and introductory activities to reach the intended learning outcomes.

Examination

- TEN1 - Written exam, 4.0 credits, grading scale: A, B, C, D, E, FX, F
- INL1 - Assignment, 1.0 credits, grading scale: P, F
- LAB1 - Laboratory work, 1.0 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.

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

The examiner decides, in consultation with KTH's coordinator for disabilities (Funka), about possible adapted examination for students with documented, permanent disabilities. The examiner may permit other examination format for re-examination of 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.