

Emerging Factory Technologies

Programme course

6 credits

Framtidens fabriker

TMPS35

Valid from: 2017 Spring semester

Determined by

Board of Studies for Mechanical
Engineering and Design

Date determined

2017-01-25

Main field of study

Mechanical Engineering

Course level

Second cycle

Advancement level

A1X

Course offered for

- Industrial Engineering and Management - International, M Sc in Engineering
- Industrial Engineering and Management, M Sc in Engineering
- Mechanical Engineering, M Sc in Engineering

Entry requirements

Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites

Production Engineering

It is recommended that the students have some general notions of industrial automation such as the ones given in TMPS21 course.

Intended learning outcomes

The aim of the course is to offer the students an overview of the future trends in factory technologies. After the course the students should be able to:

- Understand the main technical and conceptual challenges related with the 4th Industrial revolution. Understand the role of reference architectures as blueprints for creating cyber-physical production systems.
- Use the Unified Modeling Language to describe a reference architecture.
- Use the adequate software tools to implement cyber-physical production systems at a prototype scale.

Course content

The lectures will cover the following topics course it will focus on the following topics:

- The fourth industrial revolution
 - Emerging IT-based system paradigms and architectures for hyper-flexible systems.
 - Design and modelling of hyper-flexible modular production systems.
 - Autonomous and Self-organizing systems
 - Plug and Produce Systems
 - Agent-based Systems
 - Service Oriented Architectures
 - Cyber-physical Production Systems
 - Cloud Computing in a manufacturing Context (“Cloud Manufacturing”)
 - Applications of Artificial Intelligence in Production
- The laboratories will include tutorials on the use of specific industrial IT technologies that will support the subsequent laboratorial assignments.

Teaching and working methods

The course will consist of lectures and laboratory exercises. The lectures covering the different topics provide the supporting conceptual background that will be applied in the laboratory exercises. The laboratory exercises consolidate the knowledge acquired on the lectures by providing an “hands on” experience whereby the students implement a prototype that demonstrates and adaptive system and flexible system using the latest available technologies in industrial communication and automation systems most of which may still be in a prototype stage.

Examination

LAB1	Laboratory work	3 credits	U, G
UPG1	Written report	3 credits	U, 3, 4, 5

Grades

Four-grade scale, LiU, U, 3, 4, 5

Department

Institutionen för ekonomisk och industriell utveckling

Director of Studies or equivalent

Mats Björkman

Examiner

Luis Ribeiro

Course website and other links

Education components

Preliminary scheduled hours: 50 h

Recommended self-study hours: 110 h

Course literature

Additional literature

Compendia

Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at http://stydokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.