

**SYLLABUS**

# **Digital Factories 7.5 credits**

## **T7013T**

**Digitala fabriker**

**Course syllabus admitted: Autumn 2023 Sp 1 - Present**

**DECISION DATE**  
**2022-02-14**

# Digital Factories 7.5 credits T7013T

## Digitala fabriker

### Second cycle, T7013T

**Education level**  
Second cycle

**Grade scale**  
G U 3 4 5

**Subject**  
Produktionsteknik

**Subject group (SCB)**  
Mechanical Engineering

## Entry requirements

Knowledge about manufacturing processes (MPR042/T0013T) manufacturing Systems (MPR040/T0011T) and automation (MPR043/T0014T).

## Selection

The selection is based on 30-285 credits

## Course Aim

After completion of the course the student shall be able to:

1. Knowledge and understanding

- explain basic theories and concepts in kinematic simulation,
- explain methods for effective use of ergonomic and robot simulation,
- explain theories within automation and ergonomics,
- explain tools and methods for analyses applicable for automation and ergonomics,
- describe some area of research and development in kinematic simulation,
- explain sustainability (social, environmental and economic) in relation to production cell design,

2. Skill and ability

- apply basic theories and concepts in kinematic simulation,
- create 3D models of work cells for robot-and ergonomic simulation,
- program basic kinematics movements for robots, computer manikins and other objects,
- analyse and optimize design of robot and manual work stations,
- apply ergonomic analyses with computer manikins,
- apply insights in sustainability in the design of work stations,
- present, written and oral, results from simulation study including recommendations,
- critical interpret and analyse research paper in the area of robot- and ergonomic simulation,

3. Valuation and attitude

- evaluate the importance of sustainable (social, environmental and economic) in relation to work station design,
- reflect and value own contributes in laboratory and project work.

## Contents

The course concerns the interaction between different kinematics devices in the context of industrial work places and manufacturing systems. The productivity of those work places and systems are in high degree relying on the human machine interact (soft and hard factors) and knowledge in this field is of great importance for effective development of the system. The course covers areas such as: - Inverse kinematics - Robot and machine programming (off-line) - 3D-modelling - Robot performance analyses - Ergonomics

## Realization

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

Lectures, case studies, laboratory exercises and a group project.

## 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. Continuous assesment via individually graded exercises and project.

## Unauthorized aids during exams and assessments

If a student, by using unauthorized aids, tries to mislead during an exam or when a study performance is to be assessed, disciplinary measures may be taken. The term "unauthorized aids" refers to aids that the teacher has not previously specified as permissible aids and that may assist in solving the examination task. This means that all aids not specified as permissible are prohibited. The Swedish version has interpretative precedence in the event of a conflict.

## Overlap

The course T7013T is equal to MPR050

## Course offered by

Department of Engineering Sciences and Mathematics

## Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0001	Laboratory work and case studies	G U 3 4 5	7.5	Mandatory	A07	

## Study guidance

Study guidance for the course is to be found in our learning platform Canvas before the course starts. Students applying for single subject courses get more information in the Welcome letter. You will find the learning platform via My LTU.

## Last revised

by Niklas Lehto, Programme Director 2022-02-14

## Syllabus established

The syllabus was established by the Department of Applied Physics and Mechanical Engineering 2007-02-28, and remains valid from autumn 2007.