

SYLLABUS

Production, Automation and Materials 7.5 credits T0026T

Tillverkning, automation och material

Course syllabus admitted: Autumn 2023 Sp 1 - Present

**DECISION DATE
2023-02-15**

Production, Automation and Materials 7.5 credits T0026T

Tillverkning, automation och material

First cycle, T0026T

Education level	Grade scale	Subject	Subject group (SCB)
First cycle	G U 3 4 5	Produktionsteknik	Mechanical Engineering

Entry requirements

In order to meet the general entry requirements for first cycle studies you must have successfully completed upper secondary education and documented skills in English language + Chemistry 1, Physics 2, Mathematics 3c or Mathematics D

Selection

The selection is based on final school grades or Swedish Scholastic Aptitude Test.

Course Aim

After passing the course the student should be able to:

Knowledge and understanding:

- Be familiar with the different steps in common manufacturing methods.
- Compare different manufacturing methods and identify their characteristics.
- Be familiar with the most common metals, polymers and ceramics (properties, application).
- Explain the basics of automation and its function and requirements in production systems.

Skills and abilities

- Assess the appropriate contexts for the use of different manufacturing methods.
- Be able to make a choice of materials based on the manufacturing method and the application.
- Be able to apply and understand the meaning of different mechanical properties (microstructure-property-behaviour link).
- Present and explain automated production solutions to fellow students.

Judgement and approach:

- Reflect on and evaluate how the choice of materials and manufacturing method affects the sustainability of the product.
- Reflect on the technical and workplace implications of implementing autonomous systems.
- Reflect on and evaluate their own contribution during the course.

Contents

Manufacturing

- Overview of manufacturing methods
- Common manufacturing methods (including cutting, plastic working, casting and joining processes)
- Characteristics of different manufacturing methods
- Choice of manufacturing methods in relation to material, price, series size

Automation

Automated systems, their supporting components and how they work together to create added value. Value refers to production, resource and quality improvements. Automation means systems that work faster, with higher quality and at the same time with less resources.

Material

- Material selection
- Mechanical properties and their relationship to material class and type of material or alloy.
- Common structural materials: metals, polymers, ceramics
- Extreme environments for materials (corrosion, UV radiation, etc.)

Realization

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

Teaching consists of lectures, laboratory work, project work with seminar and assignments. Project work and assignments are carried out in groups. The course includes group work/collaboration/project work/analysis in partly open problems, oral and written presentation.

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. Passing the course requires passing the continuous examinations, passing the assignments, and passing the seminar. Specific requirements can be found in the respective instructions.

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.

Course offered by

Department of Engineering Sciences and Mathematics

Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0001	Continuous examination - Material	G U 3 4 5	2	Mandatory	A23	
0002	Continuous examination - Manufacturing	G U 3 4 5	2	Mandatory	A23	
0003	Continuous examination - Automation	G U 3 4 5	2	Mandatory	A23	
0004	Seminar and assignment	U G#	1.5	Mandatory	A23	

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.

Syllabus established

by Mats Näsström, Head of Undergraduate Education 2023-02-15