

SYLLABUS

Advanced processing and CyberLab 7.5 credits T7015T

Avancerad bearbetning och CyberLab

Course syllabus admitted: Autumn 2023 Sp 1 - Present

**DECISION DATE
2018-11-07**

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Avancerad bearbetning och CyberLab

Second cycle, T7015T

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

Main field of study

Materials Science and Engineering

Entry requirements

Courses in physics (MTF096/F0004T, MTF098/F0006T - mechanics, thermodynamics, atomic physics, optics), materials science (MPM032/T0004T), materials processing A (MPR042/T0013T/T0019T/T0017T), or equivalent. Recommended is also materials processing B (T7019T) and laser material processing (T0018T).

Selection

The selection is based on 30-285 credits

Course Aim

Through the course the student is expected to:

- know a comprehensive picture of traditional materials processing techniques
- know a complementary picture of selected advanced materials processing techniques
- be able to compare the different techniques with each other due to certain criteria
- in a team present and write a report for a selected advanced processing method
- comprehensively understand laser welding as the demonstrator technique
- in a teamwork plan and perform laser welding trials
- deeply understand and feel sensitive to the process physics of laser welding
- know the background of mathematical modelling
- apply mathematical modelling and conduct well organized laboratory experiments
- handle laboratory equipment by distance through lab web conference communication
- communicate via Web-conferencing in a local plus in a remote team
- create and derive theories; draw generalizing conclusions; create suitable solutions

Contents

Subject knowledge Survey on traditional materials processing techniques (cutting, forming, joining, etc.); Selected examples of advanced processing techniques (laser processing, adhesive bonding, EDM, etching, etc.); Theory and practice of laser welding Instrument knowledge Mathematical modelling; CyberLab remote experiment technique Application of engineering instruments along with personal skills Mathematical modelling of laser welding; Laser welding laboratory experiments; CyberLab remote laser welding; CyberLab remote marking.

Realization

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

Theory through self learning and few lectures; modelling and experiments through practical exercises and laboratory training in teams, including remote laboratory via Web-conferencing.

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. Classtest on survey of materials processing techniques along with a report and presentation of the project study, together with attendance of 70 % of the lectures and 100 % of the exercises will give a pass grade. Higher grades can be achieved through strong engagement or highly valuable advices/conclusions.

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
0005	Mathematical exercises on materials processing	G U 3 4 5	1.5	Mandatory	A08	
0006	Laboratory work	G U 3 4 5	3	Mandatory	A08	
0007	Project work	G U 3 4 5	1.5	Mandatory	A08	
0008	Classtest	G U 3 4 5	1.5	Mandatory	A08	

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 Mats Näsström 2018-11-07

Syllabus established

by Department of Applied Physics and Mechanical Engineering 2007-02-28