

# Electronics Manufacturing Methods and Processes

Programme course

6 credits

Metoder och processer vid elektronikproduktion

TNE087

Valid from: 2017 Spring semester

**Determined by**

Board of Studies for Electrical Engineering,  
Physics and Mathematics

**Date determined**

2017-01-25

## Main field of study

Electrical Engineering

## Course level

First cycle

## Advancement level

G1X

## Course offered for

- Electronics Design 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

Analog Electronics

## Intended learning outcomes

The aim of this course is to give the students the basic knowledge on design and manufacturing of electronics. The most important objectives of the course are to provide knowledge about printed circuit board (PCB) design, manufacturing and the component assembly process. The complete design flow from circuit schematic to assembled PCB is addressed. When encountered with, electronics associated environmental issues (Mainly chemical questions related to PCB processing.) are also discussed. Furthermore, the course contains tutorial in planning, conducting, finishing and evaluating technical projects. The students should learn how to design and manufacture their own PCBs. Such knowledge is used in courses such as Mobile Autonomous Robots. After this course the student should be able to

- Describe manufacturing process of printed circuit boards (PCB).
- Explain different IC-packages.
- Evaluate and select suitable components.
- Design and CAD and manufacture a functioning double sided PCB.
- Evaluate the functionality of the own mounted PCB.
- Predict failure risk for different PCB.

## Course content

The course is focused on the manufacturing of printed circuit boards (PCB, also known as printed wiring board (PWB).) and board assembly. The issues such as substrates, substrates packaging, components, components reliability, soldering, wire bonding, chip attach, test and environmental impact of electronics manufacturing are discussed. Since the project task is solved in groups, method and organization of technical projects is a part of the project task. To start, run and finish projects (project flow), Project planning, documentation and managing of projects.

## Teaching and working methods

Lectures and laboratory work. The manufacturing laboratory work is conducted at the ITN - printed circuit board laboratory. Furthermore the projects are based on the manufacturing of a printed circuit board. The design and manufacturing of the printed circuit board is done in groups. The group is planning, running and finishing a project on designing, CAD and manufacturing a PCB.

## Examination

KTR2	Written test	U, G	2 credits
UPG1	Laboratory and project work	U, G	4 credits

Grades are given as 'Fail' or 'Pass'.

## Grades

Two-grade scale, U, G

## Other information

Supplementary courses: Mobile Autonomous Robots

## Department

Institutionen för teknik och naturvetenskap

## Director of Studies or equivalent

Adriana Serban

## Examiner

Magnus Karlsson

## Course website and other links

<http://www2.itn.liu.se/utbildning/kurs/>

## Education components

Preliminary scheduled hours: 31 h

Recommended self-study hours: 129 h

# 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://styrdokument.liu.se/Regelsamling/Innehall/Utbildning\\_pa\\_grund-\\_och\\_avancerad\\_niva](http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva).