# Introduction to Microtechnology

<table>
<thead>
<tr>
<th>Module code</th>
<th>Workload</th>
<th>Credits/CP</th>
<th>Semester</th>
<th>Frequency of module</th>
<th>Duration</th>
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<tbody>
<tr>
<td>FH28619 (PL)</td>
<td>90 h</td>
<td>3</td>
<td>3rd onwards</td>
<td></td>
<td>1 semester</td>
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<tr>
<td>FH18619 (SL)</td>
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## 1 Module

- **a) Lecture introduction microtechnology**
- **b) lab in microtechnology**

### Teaching Language

- German

### Contact hours

- **a) 1,5 SWS / 22,5 h**
- **b) 0,5 SWS / 7,5 h**

### Self-study

- **a) 37,5**
- **b) 22,5 h**

### Class size

- **a) 10-15**
- **b) 10-15**

## 2 Learning outcomes

Once the module has been successfully completed, the students can ...  

### Knowledge (1):
After successful completion of the module the students should...

- Be aware of main steps for fabrication of miniaturized systems
- Be able to describe most important tool concepts for thin film deposition, lithography and etching

### Comprehension (2):
After successful completion of the module the students are able...

- to select proper fabrication processes for selected applications

### Application (3):
After successful completion of the module the students are able

- to calculate for some examples of microtechnological processes the needed parameters to obtain a certain result
- to perform simple process steps by themselves

### Analysis (4):
After successful completion of the module the students are able to:

- to analyse a microtechnological task, work out fabrication solutions distinguish different techniques in respect to quality measures e.g. critical dimension control
- assess problems for the use of microtechnology and suggest solutions

### Synthesis (5):
After successful completion of the module the students are able to:

- make suggestions for microtechnology process steps for the realization of microsystems

## 3 Individual component content

- **a) Overview on microfabrication and applications/products**
### II Thin film deposition (PVD, CVD, Oxidation)
### III Doping
### IV Photolithography
### V Etching techniques
### VI Actual developments for thin film deposition, lithography, materials and structuring
### VII Economic aspects (manufacturing costs)

b) Practical course in the technology laboratory for micro- and nano systems

P I Example thin film deposition: electroplating

P II Photolithography

P III RIE-Etching

P IV Measurement and characterization techniques (atomic force microscope, Scanning electron microscope, profiler)

### Teaching methods

a) Lecture

b) Lab in cleanroom

### 5 Prerequisites

Physics, maths, material science (basics)

### 6 Methods of assessment

1 exam (2 CP), lab work (1 CP), report (1 CP)

### 7 Applicability of module

Elective module for the Programmes ELAN, Mechanical Engineering and Mechatronics, International Engineering, Advanced Precision Engineering

### 8 Person responsible for module/lecturer

Prof. Dr. Ulrich Mescheder
### Reading list (Core texts and recommended texts)

- **G. Schumicki, P. Seegebrecht (ed)**: „Prozeßtechnologie“, Springer-Verlag 1991,
- **S. Globisch**: Lehrbuch Mikrotechnologie, Hsgb., Hanser 2011, sehr anschaulich mit vielen Bildern, auch für Ausbildung geschrieben!
- **Praktikumsunterlagen (Felix)**