

Course Manual MNST

Micro and nano systems

Version: 1 | Last Change: 03.11.2019 19:17 | Draft: 0 | Status: vom verantwortlichen Dozent freigegeben

– General information

Long name Micro and nano systems

Approving CModule [MNST_MaET](#)

Responsible Prof. Dr. Karl Kohlhof
Professor Fakultät IME

Valid from winter semester
2020/21

Level Master

Semester in the year winter semester

Duration Semester

Hours in self-study 78

ECTS 5

Professors Prof. Dr. Karl Kohlhof
Professor Fakultät IME

Requirements Basic knowledge of
material science desired

Language German

Separate final exam Yes

Literature

W. Menz, P. Bley: "Mikrosystemtechnik für Ingenieure", VCH Verlagsgesellschaft

S. Büttgenbach: "Mikromechanik", Teubner Verlag

Final exam

Details Oral seminar
presentation

Minimum standard Grade 4.0

Exam Type EN mündlicher
Ergebnisbericht
(Vortrag / Präsentation)

– Lecture / Exercises

Learning goals

Goal type	Description
Knowledge	Introduction Micro systems at market Production principles and strategies
Knowledge	Sensors and actuators Signal transformation Materials
Knowledge	Production technologies Clean room Lithography, micro structuring Thermal processes Thin film technologies Construction techniques Mass production
Knowledge	Design and simulation MEMSPro - Spice based circuit simulation ANSYS - Finite element simulation of physical processes
Knowledge	Applications Micro pump, micro valve, ink jet head Micro motor Acceleration sensors, gear rate sensor Micro climate sensor Micro mirror display / digital light processor Micro sensors in smart phones
Skills	Selection of known micro / nano production concepts
Skills	strategic integration of micro and nano technologies
Skills	structured design and simulation of micro / nano systems
Skills	Seminar talk: research, preparation, structuring, presentation
Skills	simulation of micro / nano systems

Special requirements

Physics, Material science

Accompanying material electronic pdf-script to presentation, electronic design and simulation tools
MEMSPro

Separate exam Yes

Separate exam

Exam Type EN Fachgespräch (Interview) zu besonderen Fragestellungen (Szenario, Projektaufgabe, Literaturrecherche)

Details Presentation of result of literature research

Minimum standard Approve

Expenditure classroom teaching

Type**Attendance (h/Wk.)**

Lecture

2

Exercises (whole course)

0

Exercises (shared
course)

0

Tutorial (voluntary)

0

– Lecture / Exercises

Learning goals

Goal type	Description
Knowledge	Presentation structure
Skills	Scientific research tools
Skills	Scientific citation
Skills	Literatur research to given topic
Skills	Structuring, preparation and oral presentation of scientific talk

Expenditure classroom teaching

Type	Attendance (h/Wk.)
Seminar	2
Tutorial (voluntary)	0

Special requirements

Knowledge in physics, material science desired

Accompanying material undefined

Separate exam Yes

Separate exam

Exam Type EN Projektaufgabe im Team bearbeiten (z.B. im Praktikum)

Details Structuring of presentation

Minimum standard Grade 4.0