

Prof. Thomas Mikolajick
Chair of Nanoelectronics, Dean of Studies

Dipl.-Phys. Manuela Tetzlaff
Study Advisor

Welcome! Herzlich Willkommen!

Nanoelectronic Systems (M.Sc.)

- Microelectronic in Saxony
- TU Dresden
- Micro-/Nanoelectronics at TU Dresden
- Faculty of Electrical and Computer Engineering
- Master's programme Nanoelectronic Systems (NES)
- General Information

ESMC/TSMC coming soon!

SACHSEN!

Technology

- GLOBALFOUNDRIES
- Infineon
- X-FAB
- Bosch
- ...

Design

- Renesas
- DMOS GmbH
- Productivity Engineering GmbH
- ...

Silicon Saxony

- 3.650 companies with about 81.000 employees
- among them more than 350 companies with about 20.000 employees active in microelectronics
- 4 billion Euros revenue
- Training/Research:
 - 4 Universities,
 - 5 Universities of Applied Sciences,
 - 18 Fraunhofer-, 8 Leibniz-, 6 Max-Planck-, 2 Helmholtz Institutes, and 2 Helmholtz centres, 8 state-funded research institutions, a total of around 50 non-university research institutions.

Applications

- Melexis
- Bender
- National Instruments (former Signalion)
- ...

Master's Programme Nanoelectronic Systems (NES)

- Start 2011; initiated by Cool Silicon Cluster

Cool Silicon (2009 – 2014): Leading-Edge Cluster with the goal of energy efficiency in the information and communications technology (ICT) sector



TU Dresden (founded in 1828)

29,000 students (21 % international students from 128 countries)

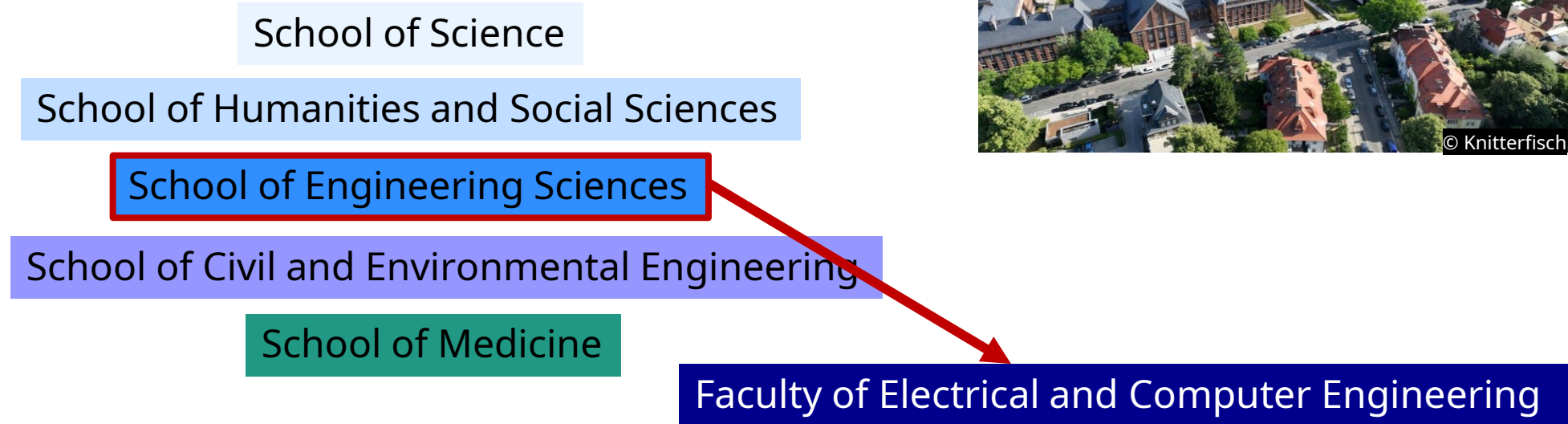
8,400 Employees

600 Professors

5 Schools

17 Faculties

121 Study Courses



- **TU9** - the Alliance of leading Universities of Technology in Germany
- **THE** overall ranking 2027 - TUD ranks 168th, placing it among the top 10% of all universities listed
- High level of third-party funding: total budget of EUR 924 million (in 2025), of which EUR 371 million via third-party funding
- On average, TUD|excite[®] supports 20 spin-offs each year
- **University of Excellence** since 2012 – 5 Clusters of Excellence

Clusters of Excellence



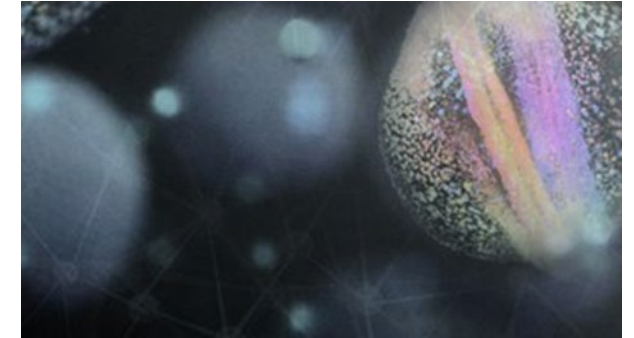
CeTI

Centre for Tactile Internet
with Human-in-the-Loop



ct.qmat

Complexity and Topology
in Quantum Matter



PoL

Physics of Life
TU Dresden



**CARE - Climate-Neutral and
Resource-Efficient Construction**



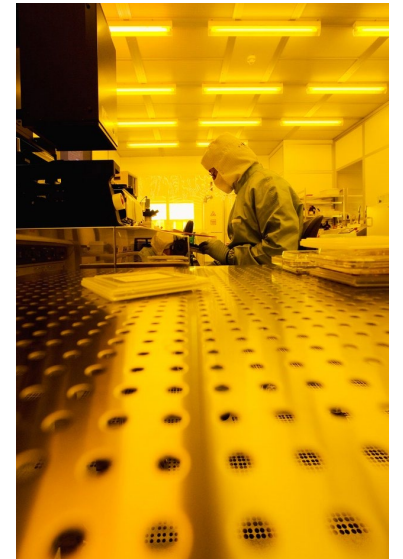
Welcome Event 2026/27 Nanoelectronic Systems



**REC²: Responsible
Electronics in the Climate
Change Era**

Nanoelectronics at TU Dresden

- **Micro-, Opto- and Nanoelectronics** is one research focus of TU Dresden
- **Faculty of Electrical and Computer Engineering**
- **Master's programme Nanoelectronic Systems (NES)**
- **Institute of Semiconductors and Microsystems (IHM)**
 - 411 m² Clean Room Laboratory (built 2006, extended 2013)
 - Chair of Nanoelectronics
- **NaMLab gGmbH (2009)**
- **Institute for Applied Physics** (Photo Physics, Semiconductor Physics)
- **Institute for Material Science**



Faculty of Electrical and Computer Engineering

- 29 professors
- 4 junior professors
- 350 PhD Students
- 460 scientific employees
- approx. 1.800 Students (332 NES Students)
- approx. 39 million Euro third party funding every year
- one of the oldest faculties for electrical engineering in Europe
- one of the largest faculties for electrical engineering in Germany
- Heinrich Barkhausen was the founder of the first Low Power Technology Institute



Faculty of Electrical and Computer Engineering

Scientific and research oriented education

High School Abitur



Diploma Programmes

- Electrical Engineering
 - Biomedical Technology
 - Information Systems Engineering
 - Mechatronics
 - Renewable Energy Systems
- 10 semesters

Bachelor



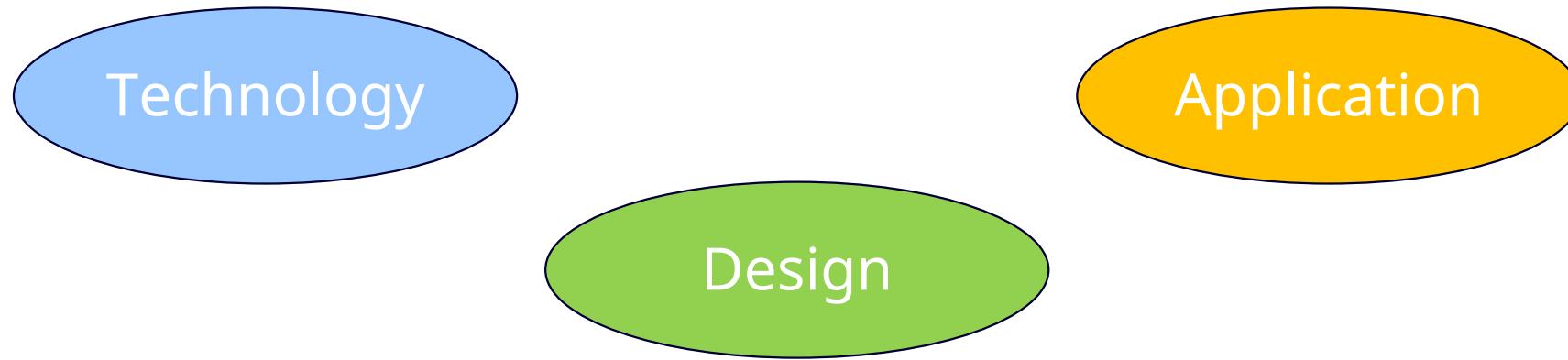
research oriented
Master's Programme

Nanoelectronic Systems (M.Sc.)
4 semesters

Structured
**PhD
Programme**
Dr.-Ing.
3 years

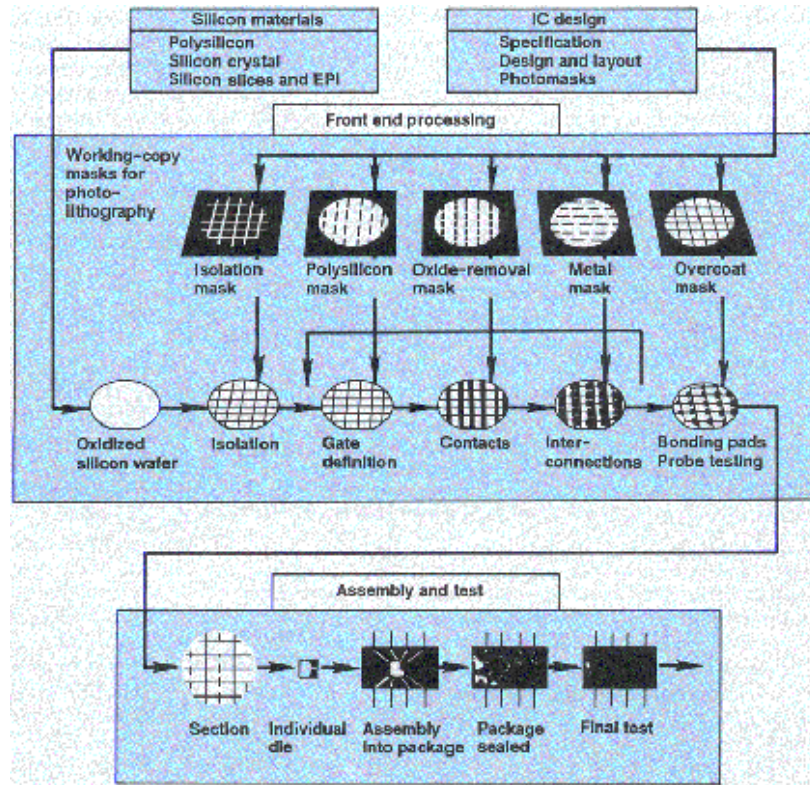
Master's programme Nanoelectronic Systems

The Master's programme Nanoelectronic Systems focuses on three key areas:



In the elective area, you are free to choose modules from only one specialization or across all specializations.

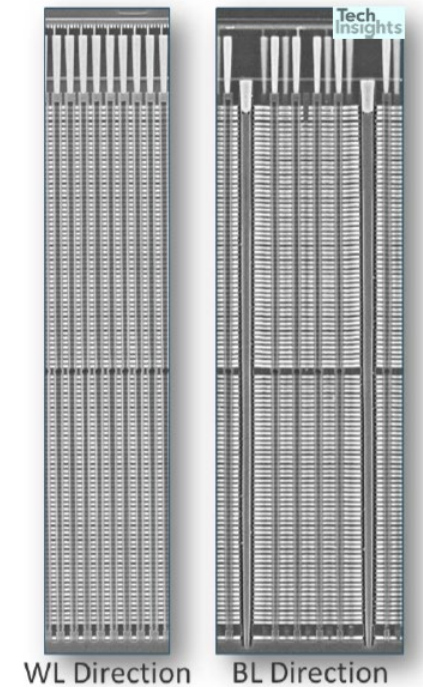
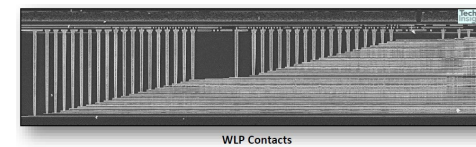
TECHNOLOGY



Typical process flow in semiconductor technology



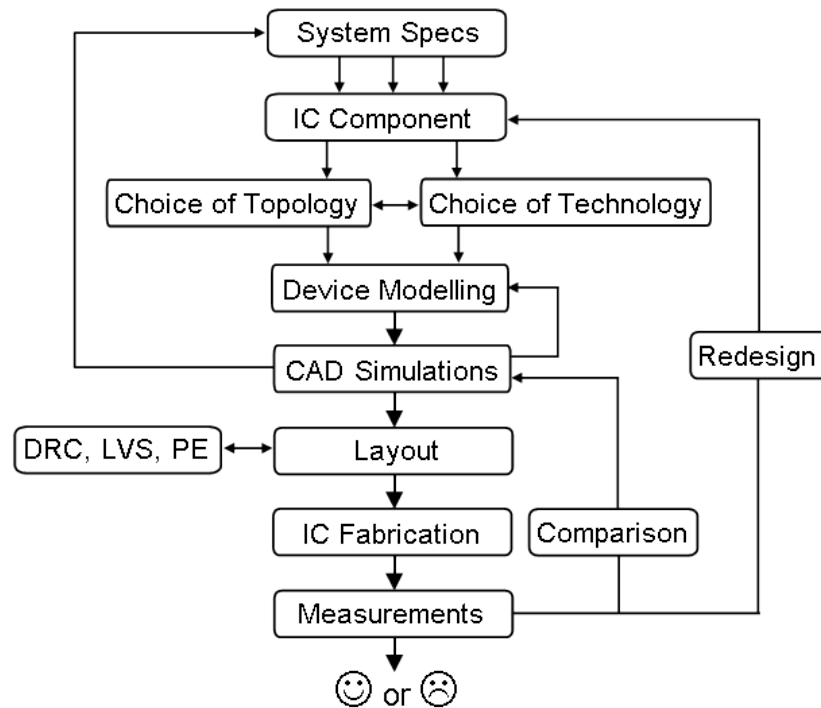
Inside the cleanroom of TUD



3D NAND cross section

DESIGN

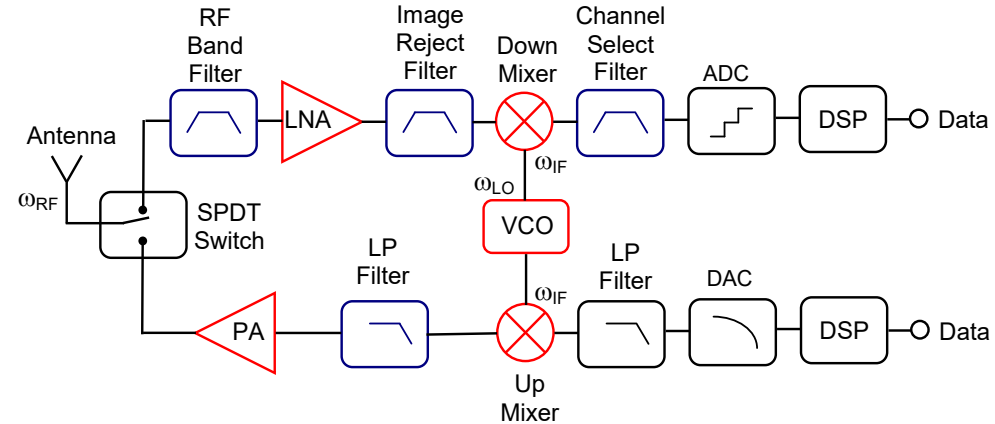
Procedure Chip Design



Example Theory

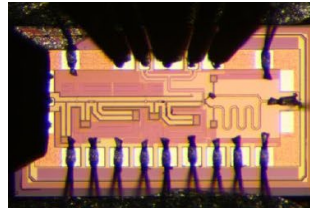
$$V_{\text{out}}/V_{\text{in}} = g_m R_L > 1$$

Example Transceiver Architectures for Wireless Communications

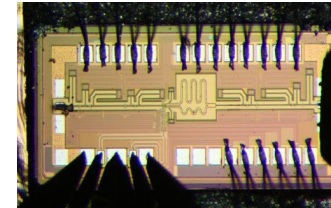


Example Chips for 6G communications, 200 GHz, 50 Gb/s wireless

Transmitter



Receiver



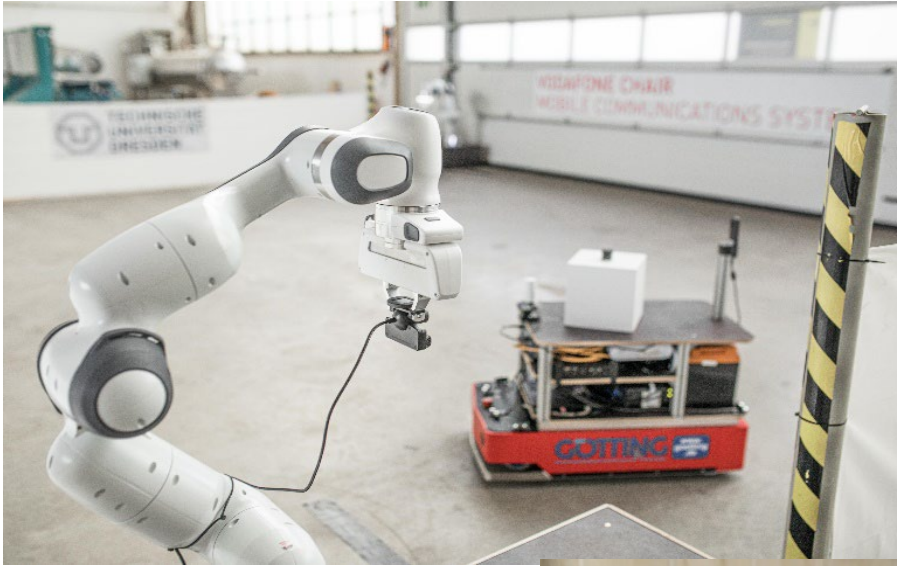
Bond-wire antennas

Fritsche, Stärke, Carta, Ellinger, A Low-Power SiGe BiCMOS 190 GHz Transceiver Chipset with Demonstrated Data Rates up to 50 Gbit/s using On-Chip Antennas, IEEE Trans. on Microwave Theory and Tech., March 2017, © IEEE

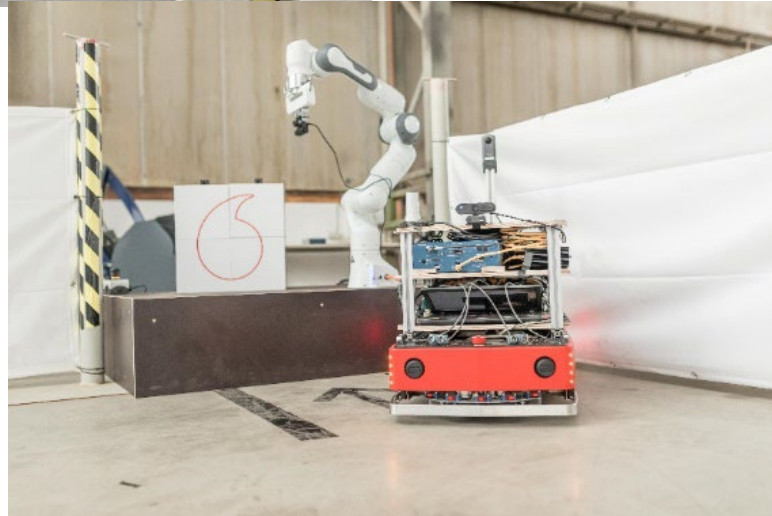
TU Dresden Chair for Circuit Design and Network Theory

APPLICATION

Automated Industry 4.0 scenario



Demo of automated robot arms and an AGV (automated guided vehicle). The AGV can be controlled remotely from anywhere in the world and connects two production lines, for example.

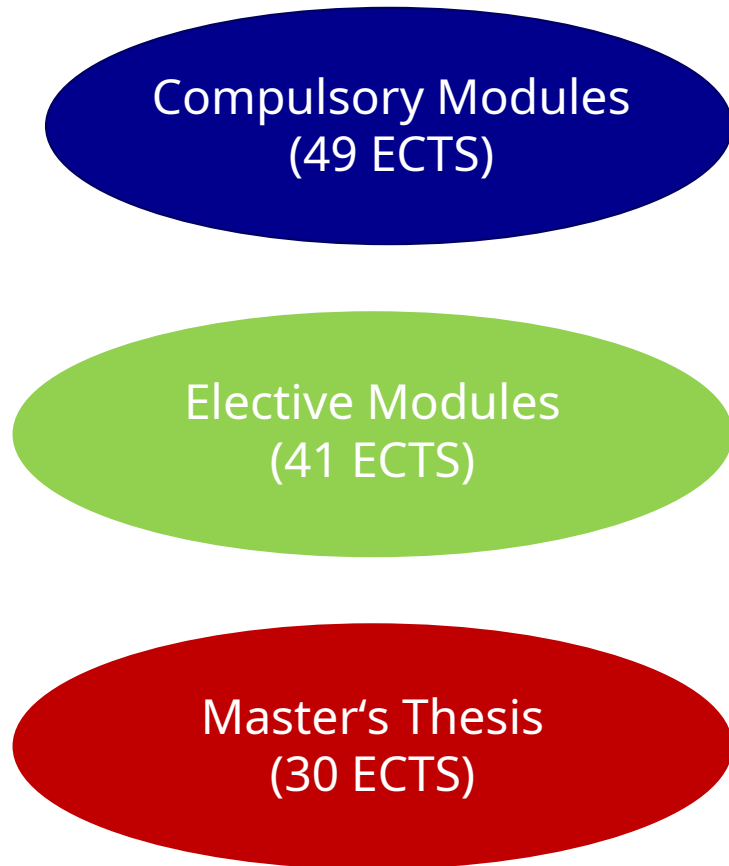


Mixed-Reality application in agriculture

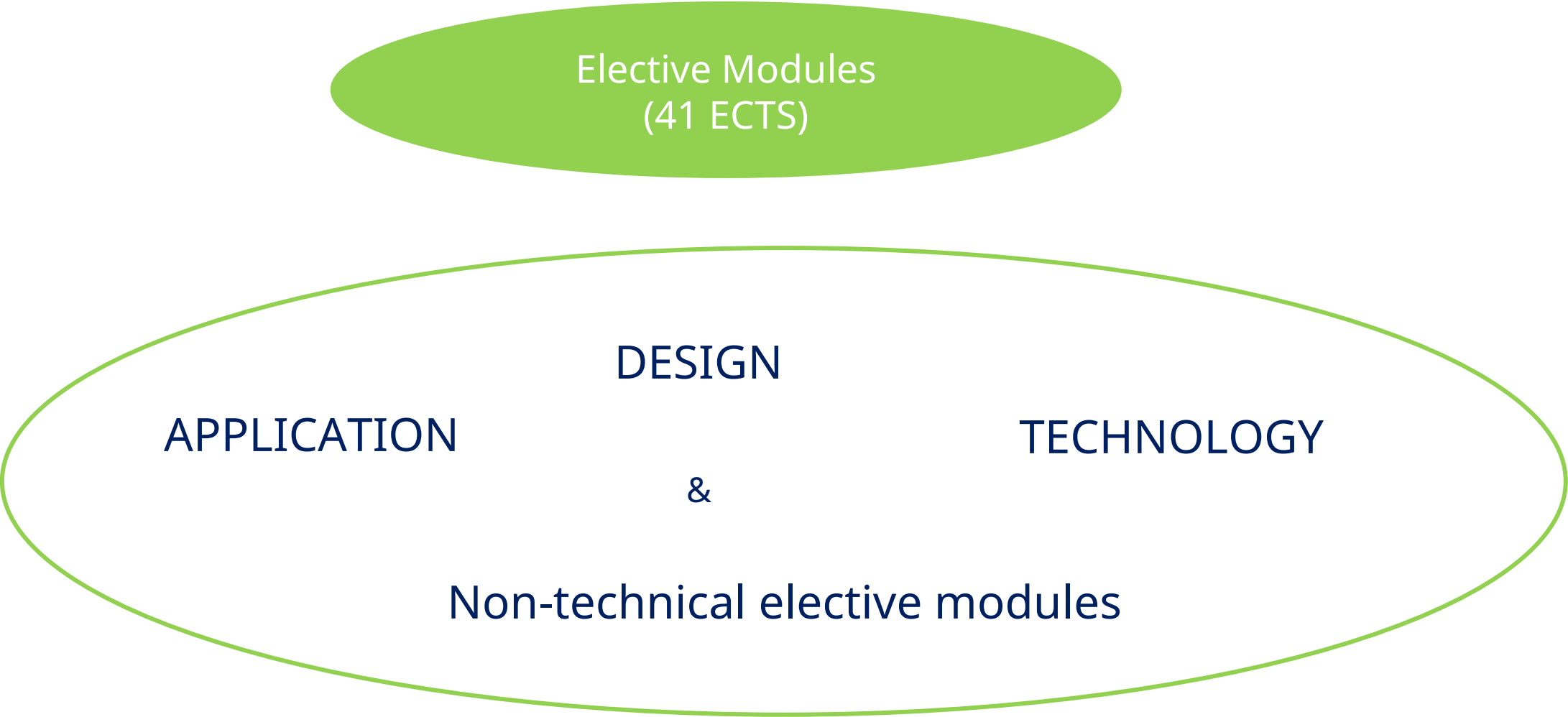


The MR demo (Mixed Reality) shows a model of an autonomous fruit harvesting robot in a vineyard. Using an app, the model (later the "real" vehicle) can be scanned and then, by clicking on the video image in the app, provides information about individual components and, for example, maintenance instructions, which are then showed on the "real" video.

Study plan of the NES programme



1 st Sem.	2 nd Sem.	3 rd Sem.	4 th Sem.
Lab Sessions (7 ECTS)		Academic and Scientific Work (5 ECTS)	Master's Thesis
Semiconductor Technology (8 ECTS)		Project Work (10 ECTS)	
Confidential Computing (6 ECTS)	Radio Frequency Integrated Circuits (8 ECTS)	15 ECTS	
16 ECTS (2-3 Modules)	Hardware/ Software Codesign (5 ECTS)		
	10 ECTS		
30 ECTS	30 ECTS	30 ECTS	30 ECTS



Elective Modules
(41 ECTS)

APPLICATION

DESIGN

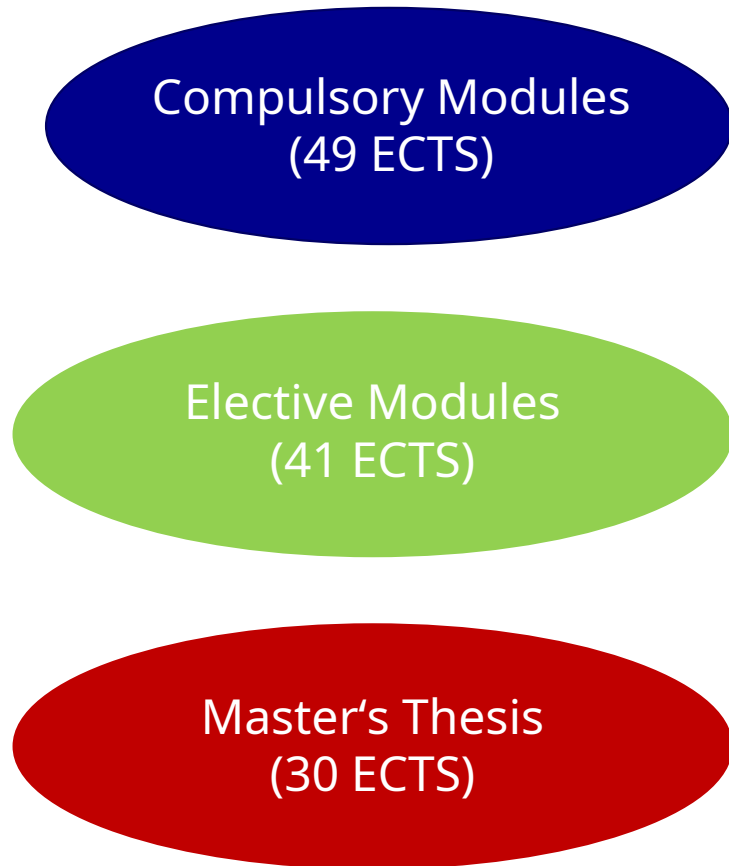
&

TECHNOLOGY

Non-technical elective modules

➤ Free choice of the modules from a catalog of more than 40 modules.

Study plan of the NES programme



1 st Sem.	2 nd Sem.	3 rd Sem.	4 th Sem.
Lab Sessions (7 ECTS)		Academic and Scientific Work (5 ECTS)	Master's Thesis
Semiconductor Technology (8 ECTS)		Project Work (10 ECTS)	
Confidential Computing (6 ECTS)	Radio Frequency Integrated Circuits (8 ECTS)	15 ECTS	
16 ECTS	Hardware/ Software Codesign (5 ECTS)		
	10 ECTS		
30 ECTS	30 ECTS	30 ECTS	30 ECTS

Lab Sessions (2 parts)

Winter semester: **RoboLab**

 Willkommen

 Einschreibung

 Erste Schritte

 Aufgabenstellung

 Prüfungsinformationen

 Nutzung von KI

RoboLab Sessions

 Welcome

 Enrolment

 Task & Definitions

 Assignments

 Exam Information

Knowledge

Registration on OPAL is required!

Dates

Winter term 2026/2027	
Period	October 2026 until January 2027
Final demonstration	January 2027, by appointment
Introduction	23.10.2026, 13:00 room HÜL/S186/H
Topic introductions	Please see schedule

Registration



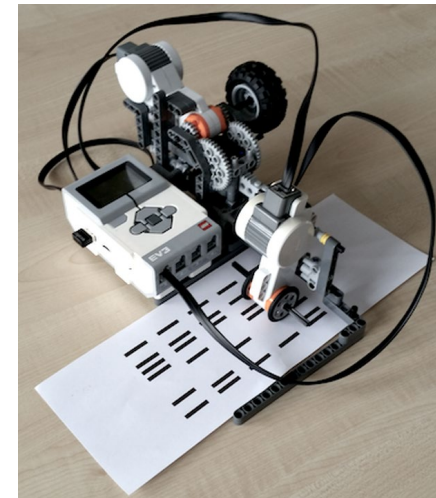
Registering on [Opal](#) is required in order to participate.
Also, you need to enrol into your corresponding module(s) on Selma.

Master Nanoelectronic Systems

► Module M1200-50040 Lab Sessions (INF-NES-C-LabS)

Summer semester, choice 1 of 3:

1. Semiconductor Technology Lab
2. Hardware/Software Codesign Lab
3. Emerging Photovoltaics Lab



WS26/27 - Registration

Informationen zum Zugang

- Dieser Inhalt ist freigegeben von 01.10.2026 00:00 Uhr bis 31.01.2027 23:59 Uhr.

Bei Fragen kontaktieren Sie den/die Verantwortlichen des Kurses: [Samuel Leo](#)

Status	Name	Beschreibung	Aktionen	Anzahl Plätze	Eintragen	Austragen
	WS26/27	• Weekly meetings on Friday, 13:00 in HÜL/S186/H	Einschreiben	0 / ∞	Erlaubt (bis 08.11.2026 23:59)	Erlaubt

1 Eintrag

German language course

- 2 groups only for NES students
- seminar building 1, Zellescher Weg 22

1st group:

Thursdays, 18:30 – 20:00, SE1 24

Fridays, 13:00 – 14:30, SE1 28

2nd group:

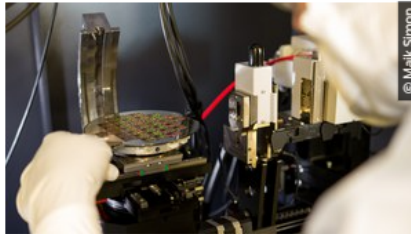
Wednesdays, 7:30 – 09:00, SE1 123

Wednesdays, 9:20 – 10:50, SE1 123

If you don't get a spot, please contact the Teaching Centre for Languages directly: sprachen.zentrum@tu-dresden.de

Faculty of Electrical and Computer Engineering

Home / Studies / Students / Study Programmes / **Nanoelectronic Systems**



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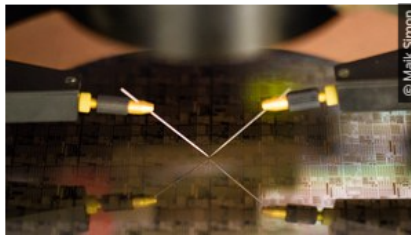
MASTER'S PROGRAMME NANO ELECTRONIC SYSTEMS

The ongoing miniaturization in the microelectronics industry leads to systems that are now being referred to as nanoelectronic systems. Such systems offer a variety of applications, but their design and implementation is becoming increasingly complex.

The Master's programme Nanoelectronic Systems focuses on three key areas:

- Technologies for nanoelectronic systems
- Design of nanoelectronic systems
- Applications of nanoelectronic systems

▾ LEARN MORE



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ArturVerkhovskiy

Prospective Students



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New Students



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Shironosov

Students



STUDENTS

Class Schedules

 **PRELIMINARY timetable for winter semester 2026/2027, 1st semester**
(as of 21st September, 2026)

 **PRELIMINARY timetable for winter semester 2026/2027, 3rd semester**
(as of 6th October, 2026)

 **List of modules that are currently in the 3rd semester timetable but can also be taken in 1st semester according to the recommendation of the lecturer**

Important Websites

modules descriptions, links to OPAL, official study documents...

> Modules and Study Guide

> Exams

> Living and Studying in Dresden

> Project work / Master's theses

> Re-registration

MODULES AND STUDY GUIDE

- [Compulsory Modules](#)
- [Elective Modules for Key Area Technology*](#)
- [Elective Modules for Key Area Design*](#)
- [Elective Modules for Key Area Applications*](#)
- [Nontechnical Elective Modules](#)
- [Overview Table of all Modules](#)
- [List of courses](#)

Compulsory Modules

Academic and Scientific Work (NES-12 ASW-14.1 // new study regulations: Eul-NES-C-ASW)



Elective modules

- Catalogue of about 40 elective modules (is updated every semester!).
- You have to select elective modules with at least **41 credit points**.
- You can choose modules of the catalogue by your own choice. The classification of modules (Application, Technology, Design) is a guideline for you only.
- If possible, **register for the module on**  (OPAL) or the course website - links can be found on website *Modules and Study Guide*.

OPAL - [the online platform for academic teaching and learning](#) - is the central learning platform of the TU Dresden and other Saxon universities. It can be used by all members of the TU Dresden with a valid ZIH user login.

What do I find in OPAL?

- lecture notes and material
- tests and tasks
- course enrolments
- learn and working groups

Exam registration



Registration period: **January/February** (announced by the examination office)

1. Register for the **module** on **selma**
2. Register for the **exam** on **selma**.

For example:

1. register for the *LabSession* module,
2. register for the *RoboLab* exam.

Main exam period: **8th February 2027 to 6th March, 2027.**

The self-management portal of TU Dresden **Selma** is a service for applicants, students and lecturers, where a variety of functions are available: e.g. Access to personal documents and data, as well as online application.

The portal can be used for registering and de-registering from examinations

Solving problems

- Visit the website of the program
<https://tu-dresden.de/ing/elektrotechnik/studium/studieren-an-der-fakultaet/master-nes>

- Ask fellow students or your mentor

- **Contact the academic advisor (study course, general problems,...)**

Manuela Tetzlaff, BAR 161, phone: +49 351 463 37363

email: master-nes@mailbox.tu-dresden.de

Tuesday: 01:00 pm – 03:00 pm

You can come by at any time. If I am not in the office, please try again or contact me by phone or e-mail.

- **Contact the examination office (questions about exams, (de-)registration, grades, ...)**

Denise Hartfiel, BAR 177a, phone: +49 351 463 42280

Office hours:

Tue 01:00 – 03:00 pm

Counseling service by phone or by appointment:

Thu 09:00 – 11:00 am

Please send your emails to the examination office only via ticket system!

- Contact the **International Office** (questions about enrollment, visa, leave of absence, ...)

email: studium.international@tu-dresden.de

Additional Office Hours:

EMM-nano Students
Friday, 09 October 1:00 p.m. (BAR172)

NES-Students
Tuesday, 13 October 3:00 p.m. (BAR172)

Announcement of the Examination Office:

The Examination Office will be closed from October 15, 2026, through December 15, 2026.

During this time, access to Selma may also be partially unavailable.

Emails will be answered on a limited basis, and response times may be longer than usual.

In-person appointments will only be scheduled for extremely urgent matters.

We appreciate your understanding.

The Examination Office

Good to know!

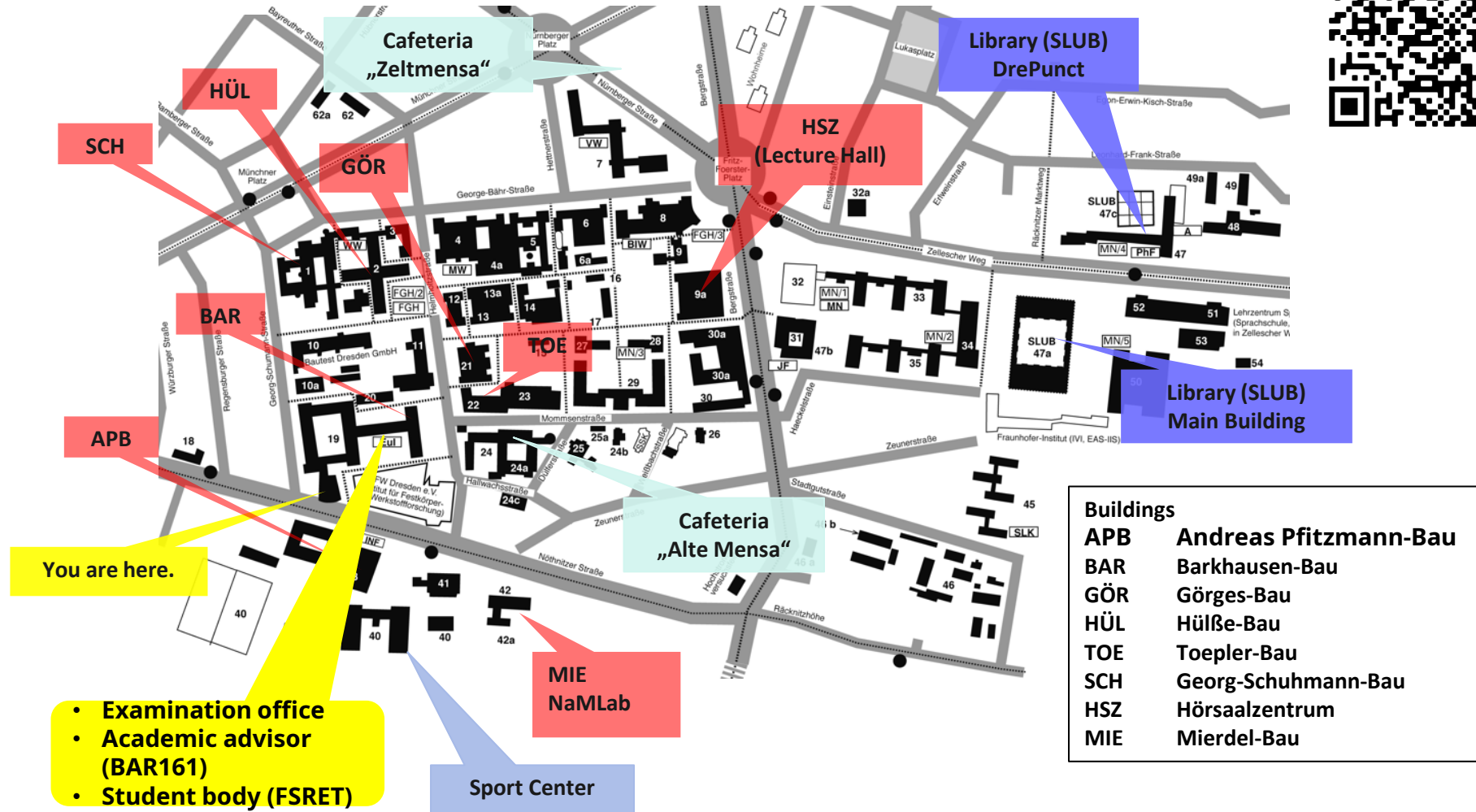
- **Check regularly your TU Dresden email account** to ensure that you do not miss any important information!
- **Deadlines are very strict**, do not miss a deadline!
- You have a **maximum of 3 attempts for an examination** – important for compulsory modules.
- **Additional semester fee** of 500 Euro/semester from the 9th semester onwards.
- First **failed attempt at the Master's thesis** (grade 5,0), if it is not started before the 9th semester.
- **De-registration** if no examination results have been achieved within 4 semesters.

Orientation on the campus of the TU Dresden



Main campus Südvorstadt

Barkhausen building



The Campus Navigator is available for your Android or iOS smartphone. Search for "**Campus Navigator - TU Dresden**" in the official app stores.

Studying in Germany

- 15 weeks lectures, tutorials and lab courses, 4 weeks exams afterwards
- Learning during the exam weeks only is not enough!
 - attend all classes every week, participate actively and start working on problems during the semester
 - treat your study like a 40hour, full-time-job
- Rule of thumb: 1 credit point is earned through 30 hours of work!

Important dates of the academic year

Winter semester 2025/26: 01.10.2025 until 31.03.2026

Courses and lectures: Monday, 13.10.2025 until Saturday, 20.12.2025 and
Monday, 05.01.2026 until Saturday, 07.02.2026

Lecture free periods and bank holidays:

- Reformation Day: Friday, 31.10.2026
- Day of Prayer and Repentance: Wednesday, 18.11.2026
- Turn of the year: Sunday, 20.12.2026 until Sunday, 03.01.2027
- Lecture-free period: Monday, 08.02.2027 until Tuesday, 31.03.2027

Main exam period: Monday, 08.02.2027 until Saturday, 06.03.2027

Academic Affairs Committee



**Prof. Thomas
Mikolajick
(Dean of Studies)**



**Prof. Gerhard
Fettweis**



**Prof. Kambiz
Jamshidi**

Student representatives:

- Ayushman Singh
- Sanjai Palanisamy
- Raghava Boya

Studies Co-ordinator:

- Prof. Mikolajick
- Raghuv eer Pundaliksa Meharwade

Examination Committee:

- Prof. Mikolajick
- Prof. Fettweis
- Prof. Mannsfeld
- Manuela Tetzlaff
- Purushothaman Ramasamy
- Preethi Doddagadiganahalli Ramesh

Thank you!

Danke!

Questions?