EE-567

# Semiconductor devices II

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| Cursus | Sem. | Type |
|---|---|---|
| Electrical and Electronical Engineering | MA2, MA4 | Opt. |

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|---|---|
| Language of teaching | English |
| Credits | 4 |
| Session | Summer |
| Semester | Spring |
| Exam | Written |
| Workload | 120h |
| Weeks | 14 |
| **Hours** | **4 weekly** |
| Courses | 2 weekly |
| Exercises | 2 weekly |
| **Number of positions** | |


## Summary

Students will learn about understanding the fundamentals and applications of emerging nanoscale devices, materials and concepts. Remark: at least 5 students should be enrolled for the course to be given


## Content

1. Advanced nm-channel CMOS devices (FinFET, UTB SOI, 2D materials, 3D integration, LiM)
2. Steep slope devices, energy efficiency (Tunnel FETs, negative-capacitance devices)
3. Neuromorphic devices and circuit architectures
4. 2D materials – introduction and materials aspects
5. FETs with 2D materials – switching, contact resistance, trap states
6. Optoelectronics with 2D materials
7. Emerging, post-CMOS concepts: valleytronics, spintronics, excitonic devices

## Keywords

Nanoelectronics, nanodevices, 2D materials, CMOS and post-CMOS concepts

## Learning Prerequisites

### Required courses

Semiconductor devices I
General Physics 4