

MICRO-623

**Modelling micro-/nano- field effect electron devices**

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<b>Cursus</b>	<b>Sem.</b>	<b>Type</b>
Microsystems and Microelectronics		Opt.

Language of teaching	English
Credits	1
Session	
Exam	Written
Workload	30h
<b>Hours</b>	<b>14</b>
Courses	14
<b>Number of positions</b>	<b>20</b>

**Frequency**

Every 2 years

**Remark**

Next time: Spring 2022

**Summary**

The course provides an in depth modeling of emerging field effect transistors in CMOS technology. Starting from the basis, the course will gradually introduce essential aspects to end up with a rigorous description of key features, Nanowire FET & its application to biosensing will also be analyzed.

**Content**

Basics of MOSFETs  
 Alternative modeling of MOSFETs  
 Short Channel effects in MOS transistors.  
 Modelling the Double Gate FET.  
 Charge based Modelling of the DG FET.  
 Quantum Confinement in DG FET.  
 The Gate All Around nanowire FET.  
 Concepts of Equivalent Parameters in MUGFET.  
 Charge based modelling of the Junction Less FET.  
 Concept of Ballistic Transport in nanoscaled transistors.  
 A simple picture of transport in 'molecules'  
 The High Electron Mobility Transistor (HEMT)  
 Bio-Sensor nanowires

**Keywords**

multigate FET, FinFET, junctionless FET, nanowires, bio-sensors, ballistic, HEMT

**Learning Prerequisites****Recommended courses**

Basic course in maths, physics