MICRO-623 **Modelling micro-/nano- field effect electron devices**

Sallese Jean-Michel

Cursus	Sem.	Type
Microsystems and Microelectronics		Obl.

Language of teaching	English
Credits	1
Session	
Exam	Written
Workload	30h
Hours	**14**
Courses	14
Number of positions	**20**

Frequency

Every 2 years

Remark

from 10:15 to 12:00 on: Monday 15 June Wednesday 17 June Friday 19 June Monday 22 June Wednesday 24 June Friday 26 June Monday 29 June

Summary

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

Content

These on-line lectures will present and discuss physics-based analytical models for some families of field effect transistor devices in advanced CMOS technology.
Requisite: basics of electrostatics and semiconductor physics.

Course dates: (each time from 10h15 to 12h00)

- Monday 15 June
- Wednesday 17 June
- Friday 19 June
- Monday 22 June
- Wednesday 24 June
- Friday 26 June
- Monday 29 June

COURSE TOPICS:

- 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

- Modeling the High Electron Mobility FETs
- Charge based modelling of the Junction Less FET
- Concept of Ballistic Transport in nanoscaled transistors
- Is the ballistic FET a vacuum tube?
- The contact resistance in nano devices
- A simple picture of transport in ‘molecules’
- FET and Bio-Sensors
- Modeling negative capacitance multigate FETs

Keywords

multigate MOSFET, junctionless FET, nanowires, bio-sensors, ballistic transport

Learning Prerequisites

Recommended courses

basics of electrostatics and semiconductor physics.