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

Next time: June 13 to 15, 2018

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

A) Bulk MOSFETs
I) The concept of inversion charge linearization
II) Transcapacitances and charge partitionning
III) Short channel effects
B) Multigate inversion mode MOSFETs
I) Electrostatics in double gate architectures
II) Quantum confinement corrections in DG FETs
III) Modelling cylindrical inversion mode MOSFETs
IV) Modeling arbitrary geometries MOSFETs
C) Junction-Less FETs (depletion-accumulation mode FETs)
I) Electrostatics in JL Double Gate junction less FET architectures
II) Modeling the nanowire JL FET
III) JL nanowires for bio-sensors (including surface/interface traps)
D) Transport at the nano-scale
I) Introduction to quantum conductance
II) Conceptual modeling of a 'molecular FET'
III) Basics of ballistic transport

Keywords

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

Learning Prerequisites

Recommended courses

Basic course in maths, physics