MICRO-623

Modelling micro-/nano- field effect electron devices

Sallese Jean-Michel

Cursus	Sem.	Type
Microsystems and Microelectronics		Opt.

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

Frequency

Every 2 years

Remark

May 21, 24, 28 & 31 from 10h15 to 12h / June 4 from 10h15 to 12h / June 7 from 10h15 to 12h and 14h15 to 16h

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

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

Resources

Moodle Link

- https://go.epfl.ch/MICRO-623