

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

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Cursus	Sem.	Туре	Language of	English
Microsystems and Microelectronics		Opt.	teaching	Linglish
			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