

MICRO-629

Silicon Photonics Design

Invited lecturers (see below), Quack Niels

Cursus	Sem.	Type
Microsystems and Microelectronics		Obl.
Photonics		Obl.

Language of teaching	English
Credits	1
Session	
Exam	Oral presentation
Workload	30h
Hours	14
Courses	7
TP	7
Number of positions	20

Frequency

Only this year

Remark

This year only. From: 18.07.2019 to: 19.07.2019

Summary

In this two-day short course we will dive into the design of silicon photonic circuits. We will take a hands-on approach toward photonic circuit design. Using a web browser environment using Jupyter notebooks, we will learn the basic design principles, construct and simulate photonic circuits.

Content

In this two-day short course we will dive into the design of silicon photonic circuits. Silicon photonics is the first technology that allows the integration of thousands of optical building blocks on the surface of a chip. This makes it necessary to start thinking of photonics in the form of circuits, rather than individual building blocks. Like in electronics, circuits combine simple blocks to achieve functionality and complexity. In this course, we will take a hands-on approach toward photonic circuit design. Using a web browser environment using Jupyter notebooks, we will learn the basic design principles, construct simulate photonic circuits and wavelength filters, use parametric design to break down the complexity onto manageable parts, and simulate how our circuit should work after fabrication, even in the presence of imperfections.

Day 1

- Introduction: silicon photonics + design flow
- Building the first circuits
- Silicon waveguides, directional couplers
- parametric design, PCells, custom layouts

Day 2

- Wavelength Filters: lattice filters, AWGs , echelle gratings
- Variability in Photonic Circuits.

Note

The course will be given with Prof. Wim Bogaerts from Ghent University.

Keywords

Silicon Photonics, Design, Integrated Photonics, Photonic Integrated Circuits, PIC, Waveguides, Resonators, Filters, Transceivers, Gratings

Learning Prerequisites

Important concepts to start the course

- Good understanding of Optics required
- Good understanding of Microfabrication Processes recommended

Resources

Bibliography

Silicon Photonics Technology Platform:

http://www.europractice-ic.com/SiPhotonics_technology_imec_ISIPP50G.php