



Introduction to the **silicon photonics** course

Prepared by the *HELIOS consortium*

- This course has been prepared within the HELIOS project “**pHotonics ELelectronics functional Integration on CMOS**” funded by EC within the 7th framework program in the ICT priority
- The project is aimed at making silicon photonics accessible to a broad circle of users
- The project includes the development of essential building blocks and, beyond, the combination and packaging of these building blocks for the demonstration of complex functions, addressing a variety of industrial needs
- More information at www.helios-project.eu

- The course aims to introduce and to prepare to the silicon photonics technology
- It is available free on the internet in order to widespread the information that silicon photonics is a viable technology for a huge variety of different applications
- The principal targets are students, researchers or engineers who are willing to get introduced to the field

- This course is prepared for a semester on silicon photonics at the graduate/PhD student level
- The course is free and will be regularly updated on an yearly basis
- The length of the course is about 21 hours
- It can be taught by an instructor in a class as well as read by a single student at home
- It can be used in its totality or some extracts
- We appreciate any comment at pavesi@science.unitn.it or <http://www.helios-project.eu/Contact-us>

- Ch 1 Introduction *Lorenzo Pavesi*
- Ch 2 Silicon Photonics Waveguides *Graham Reed et al.*
- Ch 3 Coupling to Small Silicon Waveguides *Wim Bogaerts*
- Ch 4 Passive Silicon Photonic Devices *Dries Van Thourhout*
- Ch 5 Silicon photonics resonant structures *Pierre Viktorovitch*
- Ch 6 Optical Modulators in Silicon Photonic Circuits *Delphine Marris-Morini et al.*
- Ch 7 Optical sources in Silicon Photonics Circuits *Blas Garrido et al.*
- Ch 8 Hybrid integration of III-V on silicon *Gunther Roelkens*
- Ch 9 Optical Detection Technologies for Silicon Photonics *Laurent Vivien et al.*
- Ch 10 Integration *Jean Marc Fedeli*
- Ch 11 Packaging *Lars Zimmerman*
- Ch 12 Silicon Photonic Applications *Stephan Formont*

- Silicon Photonics: The State of the Art by Graham T. Reed
- Silicon Photonics: An Introduction by Graham T. Reed and Andrew P. Knights
- Silicon Photonics by Lorenzo Pavesi and David J. Lockwood
- Silicon Photonics II: Components and Integration by David J. Lockwood and Lorenzo Pavesi
- Silicon Photonics for Telecommunications and Biomedical Applications by Bahram Jalali and Sasan Fathpour
- Silicon-Based Photonics by Erich Kasper and Jinzhong Yu
- Silicon Photonics 2006 by Vittorio M. N. Passaro
- Silicon Nanocrystals: Fundamentals, Synthesis and Applications by L. Pavesi and R. Turan
- Integrated Silicon Optoelectronics by Horst Zimmermann (Springer Series in Optical Sciences)
- Silicon Photonics: Fundamentals and Devices by M. Jamal Deen and Prasanta Kumar Basu
- Silicon-based Microphotonics by O. Bisi, S. U. Campisano, and L. Pavesi
- Optical Interconnects : The Silicon Approach by L. Pavesi; G. Guillot
- Silicon Heterostructure Handbook: Materials, Fabrication, Devices, Circuits and Applications of SiGe and Si Strained-Layer Epitaxy by John D. Cressler
- Device Applications of Silicon Nanocrystals and Nanostructures by Nobuyoshi Koshida
- SILICON NANOPHOTONICS: Basic Principles, Present Status and Perspectives by Leonid Khriachtchev