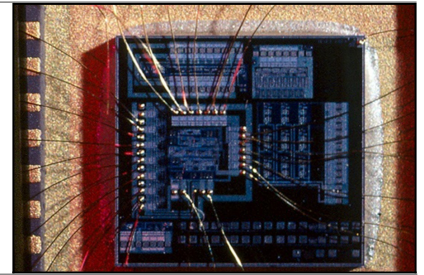


SC15 | Optoelectronics



Nouvelle Formation

NIVEAU : ADVANCED

Publics : Technician or engineer willing to understand optoelectronics systems functioning and their components

Prérequis : Basic knowledge in optics corresponding to EF1 - Optics without calculation

Responsable(s) pédagogique(s) : Nicolas Dubreuil - Enseignant-chercheur à l'Institut d'Optique

Langue de la formation : French

Capacité maximum : 12

Prix : 1380€ HT - **Durée :** 3 jours - 21 h

Objectifs

- ▶ Acquire the basic skills in optoelectronics
- ▶ Be able to communicate in the domain of optoelectronics
- ▶ Be able to understand technical specifications
- ▶ Learn how to use current optoelectronics components and instruments
- ▶ Design and set-up a simple experiment.

Thèmes abordés

Wave optics

Emission, modulation, guided optics

Semiconductor based components

2D detectors

Transmission



SC15 | Optoelectronics

Le programme

Introduction to optoelectronics

- ▶ Reminders in optics, diffraction, scattering and light propagation effects

Optical functions

- ▶ Emission, detection and deflection of light
- ▶ Optical modulation: acousto- and electro-optics, example of modulators
- ▶ Guided optics: waveguides and optical fibres

Semiconductors components

- ▶ Basics in semiconductor materials
- ▶ PIN and avalanche Photodiodes: principle of operation, characteristics, source of noise
- ▶ DEL light source: principle of operation, characteristics,
- ▶ Fabry-Perot, DFB, DBR, VCSEL... laser diode types: principle of operation, characteristics, comparison

Array detectors

- ▶ CCD/CMOS array detectors in the visible range: principle of operation, architectures, characteristics, applications
- ▶ Infrared array sensors (thermal and quantum): principle of operation, architectures, characteristics, applications

Labworks and demos

- ▶ Characterization of a LED and a laser diode
- ▶ Noise detection
- ▶ Characterization of a CMOS camera
- ▶ Optical fibre transmission: modulation formats, electro-optical modulator, set-up of a 10 Gbit/s transmission

Méthodologie et évaluation

Tutorials and exercises

Interactive experimental demonstrations

Labworks on instruments