

Online Course

# Thin-Film Optical Filter Engineering: From Design to Characterization

Supported by POEMS - Portuguese Competence Centre in Semiconductors

26 September - 24 October 2025

5 weeks  
13h-15h  
(WEST)

Free

**Apply until September 22**

**Registration link**

<https://forms.gle/dH3hEkPBGojsSVfj7>

## Target Audience:

Undergraduate, MSc, and PhD students, researchers, and early-career professionals in optics, photonics, and/or MEMS.



## Overview Program:

This course offers a complete learning pathway into the field of optical filters, focusing on multilayer thin-film filters. It covers all stages from theoretical design to computational simulation, fabrication, and characterization.

## Outcomes:

- Design skills for multilayer filters using simulation software
- Familiarity with industrial manufacturing processes
- Understanding optical filter characterization methods
- Certificate of attendance

# Detailed Program

## Thin-Film Optical Filter Engineering: From Design to Characterization

26 September (Week#1)

### Opening Remarks

(João Carmo)

#### Fundamentals of Thin-Film Optical Filters

(Sara Pimenta)

- Thin-film Optical Filters: Basic Theory
- Optical Filters Based on Thin-films
- Performance metrics
- Applications overview

3 October (Week#2)

#### Design Principles and Material Selection

(Marino Maciel)

- Thin-Film Design Theory
- Material Selection for Optical Coatings
- Design Constraints
- Simulation Tools

10 October (Week#3)

#### Fabrication Processes of Thin-Film Optical Filters: Lithography and Atomic Layer Deposition

(Manuel Silva)

- Introduction to Lithography
- Lithography Process Flow
- Fundamentals of Atomic Layer Deposition (ALD)

17 October (Week#4)

#### Fabrication Processes of Thin-Film Optical Filters: Physical Vapor Deposition

(Eliana Vieira)

- Overview of thin-film deposition techniques
- Fabrication Challenges

24 October (Week#5)

#### Characterization of Thin-Film Optical Filters

(José Rodrigues)

- Spectrophotometry
- Ellipsometry
- Interferometry/Profilometry
- Microscopy & Imaging

### Closing Remarks

(Higino Correia)

# Course Lecturers

## Thin-Film Optical Filter Engineering: From Design to Characterization



**Sara Pimenta**

Researcher at  
University of Minho;  
PhD in Optical  
Microsystems.



**Marino Maciel**

Researcher at  
University of Minho;  
PhD in Optical Science  
and Engineering.



**Manuel Silva**

Researcher at  
University of Minho;  
PhD in Electronics and  
Semiconductors.



**Eliana Vieira**

Researcher at  
University of Minho;  
PhD in Physics  
Semiconductors.



**José Rodrigues**

Researcher at  
University of Minho;  
PhD in Biomedical  
Engineering.



**João Carmo**

Associate Professor w/  
Habilitation at University  
of São Paulo - Brazil;  
PhD in Microelectronics.



**Higinio Correia**

Full Professor at  
University of Minho;  
PhD in Optical  
Microsystems.