

**Major Unit – Radiation Effects on Photonic and Optoelectronic Technologies  
(5 ECTS) RADMEP/ UJM semester 3**

**Course instructors: Ass Prof. Adriana Morana, Prof. Sylvain Girard, Prof. Emmanuel Marin and external RADMEP partners / Language of instruction: English**

**Overview**

This lecture has the objective to explain to the students how radiation will affect the most advanced technologies that are implemented or are considered for implementation in radiation-rich environments. Among the various existing technologies, a focus will be given on the radiation effects (*cumulative dose effects, displacement damage effects, single-event effects*) on the technologies already presented in the Advanced Photonics Technologies major unit.

1. Optical Fibers, Optical fiber-based sensors and lasers
2. Image Sensors and Detectors
3. Photonic Integrated Circuits and Silicon Photonics
4. Optoelectronic - Photonic components and systems:

In addition to the classroom lectures, homeworks allow exploiting the acquired knowledge will be done, basing for example, on radiation data and real experimental data acquired by the RADMEP partners

**Learning outcomes**

On successful completion of this course, students should have the skills and knowledge to:

- Know the basic mechanisms of radiation effects on Advanced Photonics Technologies
- Identify, measure and model the main parameters defining the radiation tolerance of Advanced Photonics Technologies
- Know about the hardening techniques at material, component or systems levels to improve the radiation responses of those technologies
- Know about the use of those technologies for dosimetry applications.

**Teaching methods**

- Lectures and exercises : 45 hours
- Significant part of the lectures and homeworks will be given by external RADMEP guest lecturers specialists of those topics

**Assumed knowledge**

- Bases of radiation-matter interaction
- Bases of semi-conductor physics
- Advanced Photonics Technologies (major unit)

**Evaluation criteria**

- For lectures: written exam
- For homeworks: written assignments