

5.00 credits

22.5 h + 22.5 h

Q1

Teacher(s)	Lauzin Clément ;
Language :	English > French-friendly
Place of the course	Louvain-la-Neuve
Prerequisites	LPHYS1221 for the students enrolled in the Bachelor in physics who wish to follow this teaching unit within the additional module in physics.
Main themes	Basic teaching unit, giving a description of all aspects of general optics and an introduction to laser physics.
Learning outcomes	At the end of this learning unit, the student is able to : a. Contribution of the teaching unit to the learning outcomes of the programme (PHYS2M and PHYS2M1) AA 1.1, AA 1.2, AA 1.3, AA 1.4, AA 1.5, AA 1.6, AA 2.1, AA 2.2 b. Specific learning outcomes of the teaching unit At the end of this teaching unit, the student will be able to: 1. understand basic principles of optics used for example in beamsplitters, multilayer dielectric mirrors or filters, gratings, interferometers, optical devices ; 2. use Fourier optics to solve problems of diffraction ; 3. measure temporal or spatial coherence of light sources ; 4. calculate the propagation of Gaussian laser beams ; 5. recognize the necessary conditions to build a continuous-wave laser
Evaluation methods	Written : problems to solve and questions about the theory
Teaching methods	Ex-cathedra and 5 experimental laboratories.
Content	The teaching unit is structured as follows: 1. General optics : decomposition in plane waves, polarization, linear interaction with matter, refraction, Fresnel laws, geometrical optics, imaging systems, Jones matrices, interferences, diffraction, temporal and spatial coherence, Fourier optics; 2. Lasers physics and basic properties of lasers : amplifying medium, laser cavity, Q-Switch, propagation of Gaussian beams.
Bibliography	E. Hecht, Optics, Addison-Wesley (2016). ISBN-10: 0133977226
Faculty or entity in charge	PHYS

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Additionnal module in Physics	APPHYS	5		
Master [60] in Physics	PHYS2M1	5		
Master [120] in Electrical Engineering	ELEC2M	5		
Master [120] in Physical Engineering	FYAP2M	5		
Master [120] in Physics	PHYS2M	5		
Advanced Master in Nanotechnologies	NANO2MC	5		
Master [120] of Education, Section 4 : Physics	PHYS2M4	5		