UCL Université catholique de Louvain

LPHY2245

2015-2016

Lasers and applications

6.0 credits	45.0 h + 15.0 h	2q

Teacher(s) :	Lauzin Clément ; Cornet Alain ;
Language :	Français
Place of the course	Louvain-la-Neuve
Prerequisites :	For this lecture, it is assumed that the students have already acquired the basic concepts taught in LPHY 2141.
Main themes :	The course covers in three themes. The first part gives an overview of the existing lasers and their designs. The second part is dedicated to non linear optics and the third focuses on applications of lasers in various fields.
Aims :	a. Contribution of the course to the program objectives: Axis N°1: 1.3, 1.4 Axis N°2: 2.2 Axis N°3: 3.1, 3.2, 3.3, 3.4 Axis N°4: 4.2 Axis N°5: 5.1, 5.2, 5.3 Axis N°6: 6.1, 6.2 Axis N°7: 7.1, 7.2, 7.3, 7.4 b. Specific learning outcomes of the course At the end of this course the student will be able to : 1. Understand the basic concepts of most of the commercially available lasers. 2. To design experimental setups in order to characterize a laser in the time or the frequency domain. 3. Know the basic principles of nonlinear optics. 4. Read and understand the literature on a subject not developed during the lecture but related to laser physics or applications of lasers. *The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".*
Evaluation methods :	The students will be evaluated during oral presentations about a subject they chose amongst a list of subjects related to laser physics. Including applications of lasers. The evaluation could also be on an experimental achievement and its presentation.
Content :	The course is structured as follow: 1) Light matter interaction 2) Presentation of the different classes of lasers (gas, solid state, diode) 3) Characterization of lasers in time and frequency domain. 4) Non-linear optics 5) Applications of lasers e.g. in atomic and molecular physics, and ellipsometry. According to the interests of the audience, other selected topics could be addressed.
Bibliography :	S. Hooker, C. Webb, Laser Physics, Oxford Master Series in Physics (2010) ISBN-10:0198506929
Faculty or entity in charge:	PHYS

Programmes / formations proposant cette unité d'enseignement (UE)				
Intitulé du programme	Sigle	Credits	Prerequis	Acquis d'apprentissage
Master [120] in Physics	PHYS2M	6	-	
Master [120] in Physical Engineering	FYAP2M	6	-	