Course guides
32050 - CPHOT - Computing in Photonics

Unit in charge: Barcelona School of Telecommunications Engineering
Teaching unit: 748 - FIS - Department of Physics.
Degree: DOCTORAL DEGREE IN PHOTOINICS (Syllabus 2007). (Optional subject).
DOCTORAL DEGREE IN OPTICAL ENGINEERING (Syllabus 2007). (Optional subject).
MASTER'S DEGREE IN PHOTOINICS (Syllabus 2009). (Optional subject).
ERASMUS MUNDUS MASTER'S DEGREE IN PHOTOINICS ENGINEERING, NANOPHOTONICS AND BIOPHOTONICS (Syllabus 2010). (Optional subject).
Academic year: 2015 ECTS Credits: 2.5 Languages: English

LECTURER
Coordinating lecturer: ARTUR CARNICER
Others: RAMON HERRERO CRISTINA MASOLLER

TEACHING METHODOLOGY
PRESENCIAL TEACHING + ACTIVITIES

LEARNING OBJECTIVES OF THE SUBJECT
This course introduces some numerical methods used in the description of the propagation of light through homogeneous and inhomogeneous media, and its interaction (linear and nonlinear) with matter. The main goal is to provide the students with some numerical techniques that will allow them to model optical and photonic systems. The course will be highly practical, with most of the time devoted to a computational project to be developed individually by the students.

This course aims to be introductory and is not suitable for students with good programming skills. Note that the implementation language is C.

CONTENTS

| Introduction to C programming |
| Fourier transform based methods |
| Phase-retrieval iterative algorithms |
| Finite-difference time domain methods |
| Spectral methods |
Split-step methods

Ordinary differential equations integration

Stochastic integration

GRADING SYSTEM

The specific grading distribution is divided in two parts:
· Classroom exercises: 30%
· Students are expected to develop an individual computation project of their choice. Any photonics/optics related topic is appropriate. Alternatively, the instructors can suggest a topic according to the students' interests and computational experience: 70%

EXAMINATION RULES.

The usual in University teaching

BIBLIOGRAPHY

Basic:

Complementary: