Humboldt-Universität zu Berlin
Institut für Physik
AG Theoretische Optik & Photonik
https://top.physik.hu-berlin.de/teaching

Computational Photonics (SoSe 2022): Information Sheet

Lecturer: Prof. Dr. Kurt Busch
Tutor: Bettina Beverungen

1 Moodle

The course is organized via Moodle. Please register for the course on HU-Moodle[1]. Here you will get all necessary information and material pertaining to the lecture and exercises. To obtain the password, please send an email to Prof. Dr. Kurt Busch.

2 Lecture

The lecture will take place every Thursday from 9:00 to 11:00 in NEW 14, room 1'14. The first lecture is on April 21, 2022.

3 Exercises & Tutorial

There will be bi-weekly exercise sheets consisting of a mixture of written and programming exercises, which have to be submitted via Moodle. For the written part we prefer pdf files, but photos or scans of handwritten documents are also accepted. To obtain the ECTS points for the exercise at least 50 % of the exercises must be solved with serious effort and independently.

The lecture is accompanied by a weekly tutorial session, split into two parts. This will alternate between the discussion of the problem sets on the one hand, and a more in-depth discussion of further concepts & problems closely related to the lecture on the other hand.

The tutorial session will take place every Friday from 9:00 to 11:00 in NEW 14, room 1'14. The tutorials start on May 6, 2022.

[1] https://moodle.hu-berlin.de/course/view.php?id=112330

4 Software

Parts of the exercises have to be solved with the computer. Please note that a prerequisite for this course is a basic proficiency in at least one programming language. If this requirement is not met, it is still possible to participate in the course, but please take into consideration that there might be substantial additional effort required to solve the exercises.

We accept solutions written in Matlab, Python or Julia. These are installed on the computers in the computer room[2] of the department of physics. For students of the HU, there is a Matlab campus license[3]. In principle, submissions in other programming or scripting languages are possible, but please discuss this with us in advance at the beginning of the semester.

Important: Make sure that your code actually runs before submitting it. If in doubt, test this on the PC Pool computers of the physics department. Also note that while you are encouraged to discuss the problem sets in small groups, it is expected that you implement your own version of the code, which should not have significant overlap with other submissions from either this or previous years.

5 Literature

The course is not following a specific textbook. For orientation, we provide a (necessarily incomplete) list of textbooks. There are many more textbooks that deal with the various numerical methods in photonics.

- K. Okamoto, Beam Propagation Method (chapter 7 of Fundamentals of Optical Wave-guides), Elsevier Science & Technology, Amsterdam, 2006
- B. Lee, Fourier modal method and its applications in computational nanophotonics CRC Press, Boca Raton, 2010
- U. Inan and R. Marshall, Numerical Electrodynamics: The FDTD Method, Cambridge University Press, Cambridge, 2011

6 Note with regards to COVID-19

The lecture and exercises of the Computational Photonics course will take place as in-person classes in NEW 14, room 1'14. Note that complying with the 3G rule and wearing FFP2 face masks is still mandatory on HU premises, including the seminar rooms. This information is subject to change depending on the current pandemic situation.

[2] https://www.physics.hu-berlin.de/en/computing-centre/pc-pool
[3] https://hu-berlin.de/matlab (access via VPN)