



Universität Ulm

Master of Science Physics (PO 2019)

Nano Optics

Code 8812875233

ECTS credits 4

Attendance time 3

Language of instruction English

Duration 1

Cycle each Winter Semester

Coordinator Dean of Physics Studies

Instructor(s) Prof. Dr. J.K.H. Hoerber

Allocation of study programmes Physics M.Sc., elective module

Recommended prerequisites Optics, quantum mechanics

Learning objectives Students who have successfully passed this module

- understand the wave-particle duality of emission and absorption of radiation.
- know the interactions between electromagnetic radiation and matter far below the radiation wavelength.
- know the current developments in nanooptics.
- can apply the technologies of nanooptics.

Syllabus

- Introduction to electromagnetic radiation
- Wave description of electromagnetic radiation
- Interaction of electromagnetic radiation with matter
- Detection of electromagnetic radiation
- Optical Microscopy
- Beyond the diffraction limit
- The eye as an image sensor

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- Literature**
- Feynman R, Leighton R, and Sands M. (2006). *The Feynman Lectures on Physics* Vol. I+II. ISBN 0-8053-9045-6
 - Hecht, Eugene (2001). *Optics* (4th ed.). Pearson Education. ISBN 978-0-8053-8566-3.
 - *Essential Principles of Image Sensors* , 12.8.2014 Takao Kuroda, Apple Academic Press ISBN: 1482220056
 - *Anatomy and Physiology of Eye* , 2nd Edition 1.12.2008 A.K. Khurana, CBS publishers & Distributors ISBN: 8123912677

Teaching and learning methods Lecture (2 hours per week)
Seminar (1 hour per week)

Workload 30 h lecture (attendance)
15 h seminar (attendance)
75 h self-study
Total: 120 hours

Assessment The module examination consists of a graded oral examination.

Grading procedure The module grade is equal to the examination grade.

Basis for Specialization in the field of nano sciences.
