

Astronomical Telescopes and Instruments 2017

Introduction to the Course

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Why Build Optical Instruments?

- Prime Reasons
 - instrument will do exactly what you want it to do
 - be the first to make breakthrough observations
 - superb instrument knowledge leads to better science
- Why not Engineers?
 - need astronomers and physicists who can talk to engineers
 - lack of engineers with broad knowledge
 - instrumentation research is experimental physics
- Job Prospects
 - astronomy spends a lot on telescopes and instruments
 - excellent experience for industry jobs

Course Goals & Related Courses

- 6 ECTS
- Understand how to build astronomical telescopes and instruments as an astronomer
- Related MSc courses
 - Detection of Light
 - Astronomy from Space
 - Radio Astronomy
 - High-Contrast Imaging
 - Project Management for Scientists

People

- Christoph Keller
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- Matthew Kenworthy
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- Alexander Bohn
Huygens 1125, bohn@strw.leidenuniv.nl
- more contact information on course web page

Communication

- **Emails to you:** via BlackBoard (sign up or miss important information)
- Non-UL students send email to Alexander with copy to me
- **Emails to me:** best way to communicate with me
- Course and all materials in English

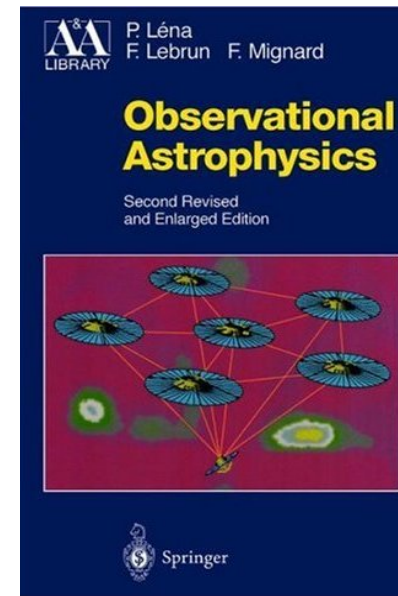
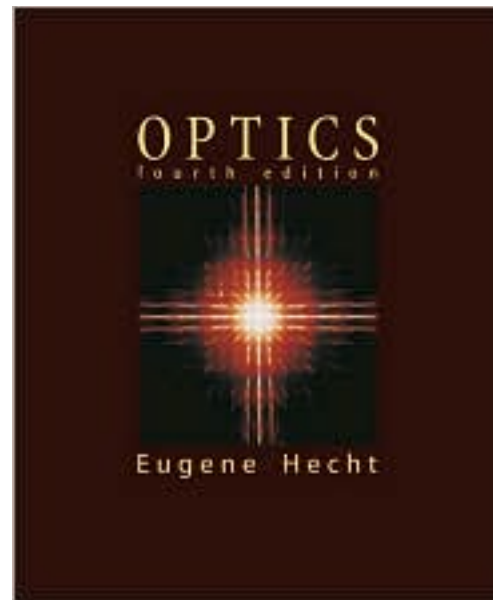
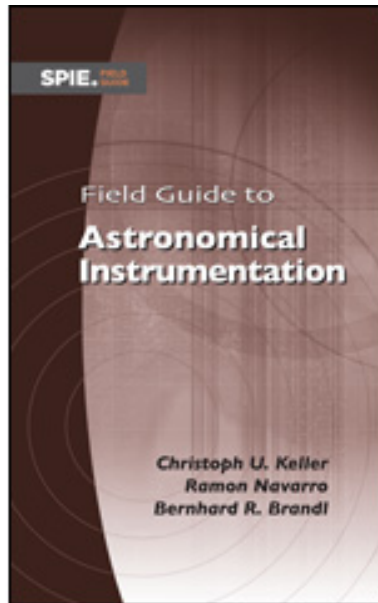
Course Web Page

www.strw.leidenuniv.nl/~keller/Teaching/ATI_2017

- Contact information
- Course schedule
- Lecture presentations, exercises, exercise materials (no exercise solutions), practicum materials
- Presentation topics and assignments including links to papers (only from UL computers)

Lecture Notes and Books

- Lecture slides as hardcopy and PDF
- Recommended books:



- BYU Physics of Light and Optics, free at optics.byu.edu/textbook.aspx

Course Schedule and Requirements

Day	Time	Room	Type
Wednesday	13:30-15:15	HL 414	Lecture
Wednesday	15:30-17:15	HL 411	Exercises etc.

- Homework, exercises, practicum, presentation are integral part of course
- Written exercises and reports have to be submitted by deadline
- Submitted work will be checked, returned, and discussed
- Solutions will not be made available in writing

Presentations

- Select one original paper and present it to peers
- 15-minute presentation in English
- Discussion of presentation
- Grade is for level of understanding of paper

Exam & Grading

- Written exam:
 - 19 December 2017, 14:00-17:00, HL414
 - tests knowledge and UNDERSTANDING of subject
- Oral exams after that
- Required knowledge: all lectures, exercises, practicum, homework, presentations
- Open book (everything on paper is allowed)
- Questions similar in style to exercises
- Grade: 60% exam, 20% homework, 20% presentation
- Mock exam towards the end of the course

Lectures

1. Foundations of Optics
2. Geometrical Optics
3. Physical Optics
4. Polarization
5. Thin Films and Coatings
6. Optical Design
7. Telescopes
8. Adaptive Optics
9. Imagers
10. Spectrographs
11. Coronagraphs
12. Interferometers
13. Polarimeters