Astronomical Telescopes and Instruments

Introduction to the Course

Christoph U. Keller, Matthew A. Kenworthy

Outline

Why Build Instruments for Astronomy?

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 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

Astronomical Telescopes & Instruments 2014

Goal (6 ECTS)

Understand how to build optical telescopes and instruments as an astronomer

People

- Christoph Keller (keller strw.leidenuniv.nl)
- Matthew Kenworthy (kenworthy@strw.leidenuniv.nl)
- Andrew Ridden-Harper (arh@strw.leidenuniv.nl)
- more contact information on course web page

Communication: Email

- no BlackBoard
- Send all of us an email

Course Web Page

Course URL

home.strw.leidenuniv.nl/~keller/Teaching/ATI_2014/

Contents

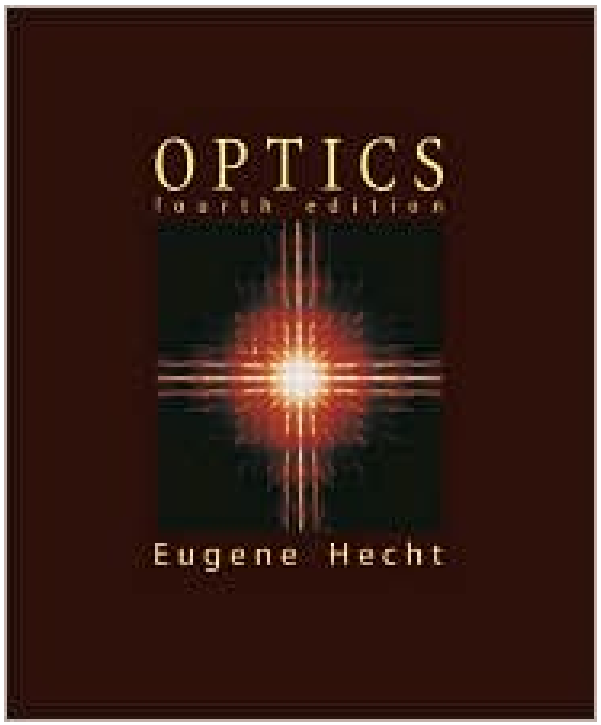
- contact information
- course schedule, subscribe to iCal link
- lecture presentations, exercises, exercise materials, practicum materials
- presentation topics and assignments including links to papers (only from UL computers)

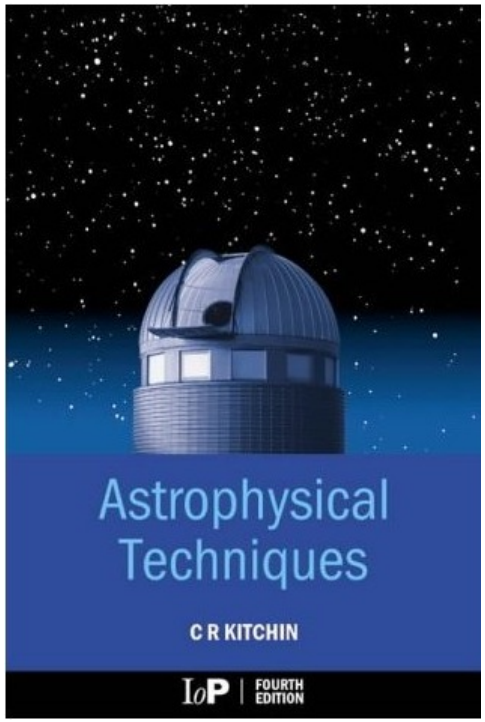
Lecture Notes and Books

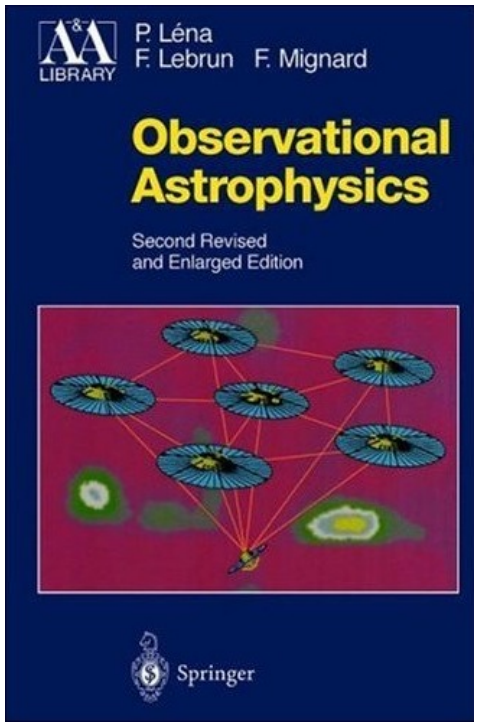
Lecture Notes

Some documents will be distributed during the course

Recommended Books







Course Schedule and Requirements

Weekly Schedule

Day	Time	Location	Topic
Wednesday	13:45 – 15:30	HL 414	Lectures
Wednesday	15:45 – 17:30	HL 411	Exercises etc.

Exercises and Practicum

- homework, exercises, practicum, presentation are integral part of course
- written exercises and reports have to be submitted by deadline
- will be checked, returned, and discussed
- solutions will not be made available in writing

Presentations

- select one original paper and present it to peers
- 20-minute presentation in English
- discussion of presentation
- grade is for level of understanding of paper

Lectures

Title	Chapter	Instructor
Introduction to the Course, Foundations of Optics	Hecht 1-4	Keller
Interference, Diffraction and Fourier Optics		Kenworthy
Geometrical Optics 1	Hecht 5	Keller
Geometrical Optics 2	Hecht 6	Keller
Polarization		Keller
Thin Films and Coatings		Keller
Optical Design		Keller
Telescopes		Kenworthy
Imagers		Kenworthy
Classical Spectrographs		Kenworthy
Advanced Spectrographs		Kenworthy
Interferometers		Kenworthy
Polarimeters		Keller
TBD		Kenworthy

Exams and Grades

Exams

- content
  - lectures, lecture notes
  - exercises, practicum, homework
  - paper presentations and questions
- written exam on 18 December 2014, 10:00-13:00 in HL414
- oral exams after that
- mock exam before end of lectures

Grades

- 60% exam
- 20% practicum
- 10% exercises (mostly homework)
- 10% presentation