UCF CREOL, THE COLLEGE OF OPTICS AND PHOTONICS

Course Syllabus

OSE 3052 L - Introduction to Photonics Laboratory

Instructor: Prof. Axel Schülzgen

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Office: CREOL A115

Office hours: Wednesday 2:00 – 3:00 pm

Class location: CREOL A210

Class meeting days: Wednesday

Class meeting time: 5:00 – 7:50 pm

Class website: UCF Webcourses

Credit Hours: 1 credit hour – 2 contact hours

Co-requisite: OSE 3052 – Introduction to Photonics or equivalent

Objective:

The objective of this lab to become familiar with the fundamental properties of light, explore optical phenomena in a laboratory setting, make careful measurements, and draw own conclusions about the models and theories that describe these phenomena.

Description:

The laboratory course is designed to reinforce the concepts discussed in class with a hands-on approach and to allow the students to learn laboratory techniques for observing optical phenomena and quantitative experimental characterization in geometrical optics, polarization, interference, and diffraction.

Learning outcomes:

After successful completion of this course, students will be able to:

- Comment on basic concepts and principles of geometrical optics, dispersion, aberration, polarization, interference, and diffraction
- Discuss the nature of light, its propagation, polarization and reflection and refraction at planar interfaces
- Describe basic optical phenomena and their applications
- Handle and align optical elements and set up basic optical experiments
- Operates optical devices and equipment
- Present their observations and conclusions in a clear informative document

Course Materials and Textbook:

- **Introduction to Optics,** F. Pedrotti, L. Pedrotti, and L. Pedrotti, Addison-Wesley, 3rd Edition, 2006.
- **Fundamentals of Photonics**, B. E. A. Saleh and M. C. Teich, Wiley, 2nd Edition, 2007.
- Relevant theoretical background material for the experiments will be provided on the course website https://webcourses.ucf.edu/

Course Requirements:

- The student is expected to review the textbooks, notes, and the lab handout and come to lab prepared to perform the scheduled experiment.
- A laboratory notebook must be used to properly document all experimental procedures, observations, data, and measurements during the laboratory session. All entries must be in ink. Lab notebooks will be examined and graded at the end of each lab.
- A type-written, clear, and informative laboratory report (in Word or PDF format) must be prepared for each experiment. The report must include the experiment title, objective, introduction and theory, experimental method, results and data analysis, observations, conclusions, and references.

Grading policy:

The final grade will be based upon:	Laboratory participation	20%
	Laboratory notebooks	60%
	Formal laboratory report	20%

- Lab notebooks will be handed out to you on the first day of the course and collected after the experiments are completed.
- Absences and Makeup Lab Sessions:
  - Because of the fluid nature of the lab with the experimental setup changing every week, there will be NO MAKEUPS ALLOWED except in cases of genuine emergency.
  - It is expected and encouraged that students finish their experiments within the assigned class time on Thursdays. However, with prior arrangements with the teaching assistant, students may be allowed to access the lab before and after the class time of the same week.
  - The instructor reserves the right to change or modify any portion of this schedule without prior notice or recourse by the students.

Grading Scale (%)	Rubric Description
$100 \geq A > 93 \geq A^- > 90$	Excellent, has a strong understanding of all concepts and is able to apply the concepts in all experiments. Has full mastery of the content of the course and lab report writing.
$90 \geq B^+ > 87 \geq B > 83 \geq B^- > 80$	Good, has a strong understanding of most or all of the concepts and is able to apply them to defined laboratory experiments. Well written lab report.
$80 \geq C^+ > 77 \geq C > 73 \geq C^- > 70$	Average, has a basic understanding of the major concepts of the course and is able to apply to basic experimental situations.
$70 \geq D^+ > 67 \geq D > 63 \geq D^- > 60$	Below average, has a basic understanding of only the simple concepts and is able to apply to only a limited number of the most basic experiments.
$60 \geq F$	Demonstrates little to no understanding of the course content.

University Rules on Professionalism and Ethics

Per university policy and plain classroom etiquette, mobile phones, etc. must be silenced during all classroom lectures, unless you are specifically asked to make use of such devices for certain activities.

Academic dishonesty in any form will not be tolerated!!! If you are uncertain as to what constitutes academic dishonesty, please consult The Golden Rule, the University of Central Florida's Student Handbook (http://www.goldenrule.sdes.ucf.edu/) for further details. As in all University courses, The Golden Rule Rules of Conduct will be applied. Violations of these rules will result in a record of the infraction being placed in your file and the student receiving a zero on the work in question AT A MINIMUM. At the instructor's discretion, you may also receive a failing grade for the course. Confirmation of such incidents can also result in expulsion from the University.

Academic Ethics Specific to This Lab Course

It is the nature of a laboratory course that you will be working in groups. Obviously, those of you who are lab partners will be using the same raw data. You are encouraged to discuss your observations and insights with your lab partners; however, each of you has to write your own ORIGINAL lab reports.
Cheating and plagiarism are serious breaches of the UCF Code of Honor as described in the UCF Golden Rule and the UCF Creed, and will not be tolerated in this course. All cases will be reported to the Office of Student Conduct (OSC).

Definitions

Cheating: any unauthorized assistance in graded, for-credit assignments.
Plagiarism: appropriating the work of others and claiming, implicitly or explicitly, intentionally or unintentionally, that it is your own.
With increased use of the internet, digital plagiarism is becoming more of a problem on campuses everywhere. You are encouraged to use the internet; however, electronic copying and pasting of material directly into reports and papers without proper reference of the source is blatant plagiarism. **Always reference the sources of information.**

Providing a fellow student with experimental data from an experiment in which he/she did not participate is also forbidden. All parties that are involved in such practice will be reported to UCF Office of Student Conduct (OSC).

If there is any question concerning acceptable practice in this laboratory course, don't hesitate to ask the instructor.

Students with Special Testing/Learning Needs

Students with special needs and require special accommodations must be registered with UCF Student Disability Services prior to receiving those accommodations. Students must have documented disabilities requiring the special accommodations and must meet with the instructor to discuss the special needs as early as possible in the first week of classes. UCF Student Disability Services can be contacted at http://www.sds.sdes.ucf.edu/, or at (407)823-2371.

Financial Aid and Attendance:

As of Fall 2014, all faculty members are required to document students' academic activity at the beginning of each course. In order to document that you began this course, please complete the following academic activity by the end of the first week of classes, or as soon as possible after adding the course, but no later than August 27; Certify that you have been educated in laser safety procedures. Failure to do so will result in a delay in the disbursement of your financial aid.

Class Website: Materials used for classes will be available on UCF Webcourses for download before each class.

List of Experiments (week-by-week calendar; subject to modifications)

1	January 13	**Introduction** **Lenses I**: Measurements of the optical power of a lens
2	January 20	**Lenses II**: Measurements of focal lengths of lenses
3	January 27	**Lenses III**: Newtonian and Gaussian lens equations
4	February 3	**Imaging I**: Object magnification and demagnification
5	February 10	**Imaging II**: Imaging with more than one lens, pupils and stops
6	February 17	**Imaging III**: Keplerian and Galilean telescopes
7	February 24	**Chromatic Aberrations**: Measurement of axial chromatic aberrations
8	March 2	**Polarization of Light**: Working principles of polarizers and waveplates
9	March 16	**Interference & Diffraction I**: Young's double-slit experiment
	March 23	**Formal Report I**: Prepare draft of formal report
10	March 30	**Interference & Diffraction II**: Apertures of various shapes
11	April 6	**Reflection Gratings**: The Littrow configuration
12	April 13	**Transmission Gratings**: Multi-slit interference
13	April 20	**Monochromatic aberrations**: Observation and mitigation of spherical aberrations
	May 2	**Formal Report II**: Revised formal report due