

# PHY 431 Optics Lab

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## Course Coordinator:

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## Lab Coordinator:

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## Teaching Assistants:

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The Lab meets in BPS 1250 with the schedule:

*Sec 001 -- Mon 6pm (closed)*  
Sec 002 -- Wed 6:10 - 9:00 pm  
Sec 003 -- Tues 6:10 - 9:00 pm  
Sec 004 -- Wed 3:00 - 5:50 pm

## Requirements:

You are required to attend one 3-hour lab per week.

You will be given a lab notebook. Bring your lab book to assist you in organizing your notes and to record raw data. The lab book need not be turned in with your write-ups but may be checked for a variety of reasons.

Digital cameras are available in the lab but you may also use your own. Please also bring a USB flash memory drive for saving digital images and data.

## Partners

The experiments are performed in groups of two or three. You should divide the labor equally with your partner and record the data in your own lab notebook. Although each group must perform the experiment independently of the others, you are encouraged to observe and discuss experimental issues with other groups.

## Absence / Late / Schedule Conflict Policy

There will be no opportunities to make up a missed lab. If a lab is missed with a legitimate excuse, such as an extended illness, you should inform me by email or phone no more than 48 hrs after the lab. In most cases I will ask for some documentation, such as a doctor's note.

If an occasional schedule conflict should arise, please contact me by at least 24 hrs in advance. In most case, you will be able to swap sessions.

Students who arrive late may not be allowed to do the lab at the instructor's discretion. Inform your TA or me, and your partner (s) shall you anticipate late arrival within an hour.

## Lab Instructions and Procedures

Here is a tentative schedule for the labs.

Laboratory procedures can be downloaded from the course website.

You are required to print and study the lab instructions posted online in advance. You will lose 1 point out of 10 for that lab report if you do not bring a printed copy of the lab instruction to the lab.

Week	Lab Instructions	Report Due
<b>1: Sep 1</b>	No Labs	
<b>2: Sep 6-7</b>	<a href="#">Requirements for lab notebooks</a> Style guide for lab reports  Demo: <a href="#">Two Slit Interference, One Photon at a Time</a> - The Essential Quantum Paradox	
<b>3: Sep 13-14</b>	<a href="#">L1: Thin Lens</a> Additional References: <a href="#">Imaging Properties of Lens Systems</a>	<b>Sep 27-28</b>
<b>4: Sep 20-21</b>	<a href="#">L2: Telescope and Microscope</a>	<b>Sep 27-28</b>
<b>5: Sep 27-28</b>	<a href="#">L3: Lens Aberration, Introduction to Aberration</a>	<b>Oct 4-5</b>
<b>6: Oct 4-5</b>	<a href="#">L4: Polarization</a> <a href="#">Polarization Tutorial ; Polarization Control</a>	<b>Oct 11-12</b>
<b>7: Oct 11-12</b>	No Labs.	
<b>8: Oct 18-19</b>	<a href="#">L5: Interference Fringes &amp; Newton's Rings</a>	<b>Oct 25-26</b>
<b>9: Oct 25-26</b>	<a href="#">L6: Michelson Interferometer</a>	<b>Nov 1-2</b>
<b>10: Nov 1-2</b>	<a href="#">L7: Diffraction Slits and Gratings</a>	<b>Nov 8-9</b>
<b>11: Nov 8-9</b>	<a href="#">L8: Holograms</a>	<b>Nov 15-16</b>
<b>12: Nov 15-16</b>	L9: Advanced Optics Lab	<b>4pm, Dec 9</b>
<b>13: Nov 22-23</b>	No Labs.	
<b>14: Nov 29-30</b>	L9: <a href="#">A. Optical Trapping, Reference paper</a>	
<b>15: Dec 6-7</b>	B. Photoelectric Effects	
	C. Fourier Optics/Computer Generated Holograms	
	D. Quantum Optics (Proof of the existence of photons, Bell inequalities, single photon interference, Hardy's test of local realism)	