SYLLABUS
OPTI 380B (1 unit)
Intermediate Optics Lab II
Spring 2026

Lab Schedule: (Room 450, Optical Sciences Center)

Monday	Tuesday	Wednesday	Thursday
	10:30am-1:20pm--sec.A	---	
2:30-5:20 pm--sec. C	2:00-4:50 pm--sec. B		2:00-4:50 pm--sec. G
		5:00-7:50 pm--sec. E	5:00-7:50 pm--sec. H

Lab Lecture (Mon. 12:00–12:50 pm; in-person, ***The Commons, Room 310***)

Description of Course

This lab course has been designed to closely follow ECE 207 Elements of Electrical Engineering or ECE 220 Basic Circuits. It provides hands-on experience with most of the concepts taught in these courses. If you are majoring in Optics, then 380B is a required course. It is expected that you have taken either ECE 207 or ECE 220 before taking this course, OPTI 380B.

Course Prerequisites or Co-requisites

Students must be enrolled in, or have already taken ECE 220 or ECE 207.

Instructor and Contact Information

Instructor: Prof. Michael Nofziger ("Dr. Mike")
Meinel 412A; 520-626-8363; nofziger@arizona.edu
Office Hours: Tue. 1:00–3:00 pm or by appointment

Graduate Teaching Assistant: Abrar Liaf abrarliaf@arizona.edu
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Web information: Course notes may be found on the D2L site for this course, OPTI 202L.

Course Format and Teaching Methods

Weekly Labs (in-person) with a weekly Lab Lecture (in-person).

Course Objectives

The main objectives for this lab are to learn the basics of electronic measurements, and how to construct and make measurements of basic circuits—basic analytical instruments, linear and non-linear circuit elements, transistors, op-amps, active filters, oscillators, voltage regulators, logic, gates and flip-flops, counters and registers, data converters, and computer interfacing, programming, and data acquisition.

Expected Learning Outcomes; Relationship to ABET Student Outcomes (1-7)

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

- use an electronic breadboard to build circuits
- use various electronic instruments:
  (digital multi-meters, power supplies, oscilloscopes, function generators)
- design and build simple circuits
- use the Arduino microcontroller to:
  - write simple C++ programs to control hardware
  - interface to and write data to LCD displays
  - run various motors (DC, stepper, servo motors)
  - digitize analog signals using the built-in A/D converter
  - interface to and read signals from various sensors (light, temperature, humidity, etc.)
  - interface to and control a LIDAR
- integrate all aspects of the Arduino labs to build a system that digitizes, records and displays measurements of a real-world space (our lab room, the light shaft in our building, etc.)

Course Policies:

UA Policies on: Absence & Class Participation, Threatening Behavior, Accessibility & Accommodations, Code of Academic Integrity (plagiarism), Nondiscrimination & Anti-Harassment, Safety on Campus & in the Classroom, Subject to Change, are all found here: **https://catalog.arizona.edu/syllabus-policies**

Absences pre-approved by the UA Dean of Students (or Dean Designee) will be honored. See: https://deanofstudents.arizona.edu/policies/attendance-policies-and-practices

Participating in the course, and attending lectures in-person are vital to the learning process and critical to being successful in this course. Our class lectures and discussions will add information and details to our textbooks and our online lecture notes.

As such, attendance is expected, but not required, at all lectures. Absences will likely affect your learning of the material, and therefore your final course grade. If you are unable to participate in class activities for whatever reason, please contact me (Dr. Mike) as soon as possible.
"If you are experiencing unexpected barriers to your success in your courses, please talk with your Undergraduate Academic Advisor. To request a disability-related accommodation to this attendance policy, please contact the Disability Resource Center at (520) 621-3268 or drc-info@email.arizona.edu. The Dean of Students Office is a central support resource for all students and also may be helpful. The Dean of Students Office is located in the Robert L. Nugent Building, Room 100, or call 520-621-7057."

Plagiarism: *Plagiarism is not allowed. Period! No Exceptions!!!*

Required Texts or Readings

- All lab handouts and class notes are available on our class D2L webpage.
- Textbooks we'll be using are available on our class D2L webpage.
- You are required to keep lab notes, either in some type of bound lab notebook ***or*** electronically. (no loose sheets of paper or 3-ring binders, etc.).

Required or Special Materials

None.

Assignments and Examinations: Schedule/Due Dates

Weekly Lab Work (a.k.a. "this is what's DUE each week"):
For each lab, the following work will be due:

(a) Lab Objectives
(b) Schematic Diagram(s)
(c) Pre-Lab Questions

(d) Lab Notebook—answers to all "In-Lab" Questions + (entries, observations, notes, etc.)
(e) Lab Summary
(f) Post-Lab Questions

- ► All work is to be submitted electronically to the appropriate Assignment dropbox in D2L. Nothing is to be turned in on paper.
- ► Parts (a)–(c) are to be turned in to D2L as a single pdf file ("yourlastname Lab# abc.pdf") (this file is DUE at the start of the current lab)
- ► Parts (d)–(f) are to be turned in to D2L as a single pdf file ("yourlastname Lab# def.pdf") (this file is DUE at the start of the following week's lab)

All Lab Work MUST be your own work, written in your own words. Parts (a) "Lab Objectives" and (e) "Lab Summary" must be typed. To the extent possible, type your answers to all Pre-Lab Questions and Post-Lab Questions, the exception being for equations—they may be hand-written and scanned. Answers to all "In-Lab" Questions may be answered either in your notebook or electronically, but answered during lab.

Final Examination or Project

There is no final exam in this course. Instead, the Final Analysis assignment takes the place of a final exam:

Final Analysis:
This will take the place of a traditional final lab report. Identify 3 specific things that you don't understand about material covered in OPTI 380B, OPTI 330, OPTI 340, or OPTI 370. Think critically about what it is that you don't understand about each item, and why you have had trouble understanding it. Write at least a half page for each item, explaining this. Full credit will be earned for length (writing at least half of a page for each item), and content (the extent to which you demonstrate 'critical' thinking about your misunderstandings).

Final Analysis is due by 5pm, Wed. May 6, 2026.

Grading Scale and Policies

Lab Objectives	10 points/lab	x 11 labs =	110
Schematics	10 points/lab	x 11 labs =	110
Lab Notebook + Questions	45 points/lab	x 11 labs =	495
Pre-Lab and Post-Lab Questions	25 points/lab	x 11 labs =	275
Lab Summary	10 points/lab	x 11 labs =	110
Final Analysis	100 points		100
		TOTAL POINTS	**1200**

- Final grading for the class will be done on a curve. If your score falls "in-between" letter grades, input from your TA will be used to assess how you performed in lab, to make a final decision on your grade.

- **LATE POLICY: Unexcused late material will be accepted up to a week after it was due, and will be graded at 75% off. If you miss a lab, it may be made up only because of medical reasons, or family emergency. The lab should be made up as soon as you are able to return to campus. Makeup work with an excuse will be graded with no penalty.**

(a) Lab Objectives: (10 points)
This is a written exercise for you to think about and define the objective(s) for each circuit that you will build and test, before actually doing the lab. Write this in paragraph form, using complete sentences (one paragraph per circuit or experiment).

(b) Schematics: (10 points)
Draw a schematic diagram for "selected" circuits you will build.

(c) and (f) Pre-Lab and Post-Lab Questions: (25 points)
Pre-Lab Questions: **(PL#)** Due at the start of your lab.
Post-Lab Questions: **(L#)** Due at the start of the next lab.

(d) Lab Notebook and In-Lab Questions (45 points)
Your lab notebook must include the following for full credit:
--All raw data that you took (numbers, tables, graphs, etc.).
--All observations that you made.
--"In-Lab" Notebook Questions: **[Q#]**
Answered in your notebook during lab, clearly labeled [Q#].

(e) Lab Summary (10 points)
A summary of what actually happened, what you observed and did in the lab, and any problems you may have encountered.

Scheduled Topics/Activities

Week 0: 12 January 2026
NO LABS this week

Week 1: 19 January 2026
NO Lab Lecture this week—MLK Holiday on Monday, Jan. 20
NO LABS this week

Week 2: 26 January 2026
Lab 1: Basic Circuit Construction and Electronic Instrumentation
Read Lab #1, and answer the Pre-Lab Questions.

Week 3: 2 February 2026
Lab 3: Op-Amps I: Introduction

Week 4: 9 February 2026
Lab 4: Op-Amps II: Circuits

Week 5: **16 February 2026**
Lab 5: Digital Logic: Introduction to Logic Gates and the Arduino I/O

Week 6: **23 February 2026**
Lab 6: Data Acquisition, FFT, and Aliasing

Week 7: **2 March 2026**
Lab 7: Design Project: "Automatic LED Night Light"

Week 8: **9 March 2026**
NO Labs this week: Spring Break!

Week 9: **16 March 2026**
Lab 8: Microcontroller I
"Basics of the Arduino Microcontroller, I2C bus, Digital I/O"

Week 10: **23 March 2026**
Lab 9: Microcontroller II
"DC Motors, Stepper Motors and Servo Motors"

Week 11: **30 March 2026**
Lab 10: Microcontroller III
"A/D Converter, Data Acquisition and Storage"

Week 12: **6 April 2026**
Lab 11/12: Microcontroller Data Acquisition Design Project…

Week 14: **13 April 2026**
Lab 11/12: Microcontroller Data Acquisition Design Project…

Week 15: **20 April 2026**
Lab 11/12: …Microcontroller Data Acquisition Design Project.

Week 16: **27 April 2026**
Lab 11/12: …Microcontroller Data Acquisition Design Project.

Week 17: **4 May 2026**
NO LABS--Last Week of Classes
Final Project Presentations (during Lab Lecture on Monday, May 4)
Final Analysis; Final Report (Microcontroller Project) **due by 5pm, Wed. May 6.**

Week 18: **11 May 2026**
NO LABS--*FINAL EXAM Week*

Subject to Change Statement

Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor.