

PHYS 153

Light, Color, & Vision

Spring 2019

CRNs: 34757

Pre/Co-requisite: PHYS 203

When & where we meet:

Tue & Thu 10 - 11:50am

Room 100 Willamette Hall

This course is taught



with unionized labor.

Course Description

This course has been designed to engage you in an active role in your learning. Self-assessment is an important form of internal feedback for this process. In a very real sense we will be aiming to participate in the process of science in order to learn science.



SCIENCE LITERACY PROGRAM

As part of the Science Literacy Program we will pay special attention to uncovering ways science is connected to larger societal issues and big ideas across and within the discipline. SLP courses include General Education courses for non-science majors and courses for science majors taught by teams of faculty, graduate fellows, and undergraduate scholars, who will include opportunities during classtime for you to engage with the class topics through a variety of activities. For more information about the program scilit.uoregon.edu

Your Teaching Team

Instructor Name: Dr. Billy Scannell scannell@uoregon.edu

Please call me "Billy" in all communications. (he/him/his)

Office Location: 145 Willamette Hall

Office Hours: Open Door Policy and 3-4 Tue & Thu

Instructor Phone Number: 541-346-5256

Co-Instructor:

Andrea Goering ayocom@uoregon.edu

Office Location: Willamette Hall

Office Hours:

GEs (GE, email, Office hour time and location in Willamette Hall)

Kahli Burke, kahli@uoregon.edu , TBA Room 463

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Ethan Turner, eturner7@uoregon.edu , TBA Room 218

SLP Scholar: Nikki Bennett nikkib@uoregon.edu

What are Office Hours?

We are here to help guide your learning and help you succeed during the course. We are available during office hours to answer questions about this course or provide additional resources. We invite you to come visit us, so we can meet you and learn more about your interests in the course. Office Hours are a great way to make connections with faculty and graduate students which may be helpful when you need future letters of recommendation or academic advice.

In this course students will

- Understand the Process of Science.
- Draw meaningful conclusions from observations of the physical world.
- Construct knowledge in a way that does not rely on an outside authority.
- Develop accurate, evidence based, plain language explanations for the topics and phenomena discussed in the course.
- Understand visible light as a small segment of the electromagnetic spectrum
- Develop and understanding of how an image is produced
- Understand the wave and particle nature of light

How will you be graded?

Grades will be based on in class activities (worksheets, “clicker” – type questions, Exams) and out of class activities (Reading Questions, Homework sets, Mini-projects). There will not be a Final exam during finals week.

The relative weights will be as follows:

Activity	Points
Class Participation (In Class questions and worksheets)	100
Mini-Projects (“Think and Do” activities from the text)	75
Reading Questions (Due by midnight before each non-exam class meeting)	75
Homework Sets (Due each week on Mastering Physics)	100
Exams (3 equally weighted exams)	150

The Approximate Grade Distribution will be as follows:

500 - 436 = A, 435 - 376 = B, 375 - 316 = C, 315 - 250 = D, 249 or below = F.

Note: Each category above has a built in buffer (i.e. there are more points available than listed above in each category).

What supplies will you need?

The required text is Conceptual Physics by Paul Hewitt.

An e-text version of the 12th edition and access to Mastering Physics is available at the bookstore.

Access to Mastering Physics is required

Student Registration Instructions for Mastering Physics can be found on Canvas located in the “Course Documents” module (the same module as this document).

How you'll know you're learning.

In addition to the global Course Goals above, Learning Outcomes will be associated with each of our class meetings. These are intended to aid self-assessment.

In Class Questions: We will use a system called Learning Catalytics to record responses to in class questions. Learning Catalytics is a "Bring your own device" response system, you can use a laptop, tablet, smartphone to interact with the response system. If you do not have access to one of these devices please come see me and we can make arrangements for your engagement for this aspect of the course.

Worksheets: Some in class activities will involve worksheets which will be collected. Sometimes these will involve predictions that you will need to hand in to receive credit. On occasion you may also be asked to reflect on the activity, paying attention to how the activity modified your thinking about the concept being addressed.

Mini-Projects: You will be assigned "Think and Do" assignments from each chapter of the text. These types of assignments are hands on "Try this at home" activities and are considered separate from Homework Sets. This category allows that work to contribute to your grade. Pick a "Think and Do" activity from the current chapters of your text. For each Think and Do activity you will need to submit a short (1 page max) write-up that includes a "selfie" of you carrying out the mini-project. You are required to turn in 5 Mini-projects throughout the term, but are certainly encouraged to do more (yes, for credit!)

Reading Questions: Reading Questions will appear on Mastering and are due at midnight the day BEFORE each class meeting that is not set aside for an exam. The intent of these questions (and the reason they are due BEFORE class) is twofold:

1. To help motivate you to read the text PRIOR to coming to class.
2. To probe the depth of your understanding of the topics we are discussing.

Physics tend to be a subject that one cannot learn in a quick reading (like one might read a novel). Often times it may not be clear to you what questions you have (or where your understanding is fuzzy). The reading questions provide an assessment to help direct our in class discussion. In this way they allows us to make use of our time together as efficiently as possible.

Homework Sets: Each week there will be a homework set due on Mastering Physics. Homework sets will be due (electronically submitted) 15 minutes before each Tuesday before class meeting. (i.e. Due dates will be set for 9:45 Tuesday).

Exams: There will be three equally weighted exams in this course. For each exam, 75% of your score will come from individual effort, the remaining 25% will come from group work.

Academic Integrity

All students are expected to complete assignments in a manner consistent with academic integrity. Students must produce their own work and properly acknowledge and document all sources (ideas, quotations, paraphrases). Students can find more complete information about the University of Oregon's Policy on Academic Dishonesty in the University of Oregon Student Handbook.

A few things to help you succeed in this course

1. **Participate!** Class Participation is more than sitting as a warm body in the class. Please come to class prepared to participate in group work and class discussions. Participation includes respect for your learning community by coming to class on time, turning off cell phone notifications, and paying attention during class.
2. Regularly reflect on your learning. Taking the time to think about your learning has been shown to help you learn better.
3. Please feel free to ask questions in class, during office hours, and via email.
4. If you miss a class meeting due to some circumstance beyond your control, contact the instructor as soon as you are able. Additionally, you will want to arrange to get notes from one of your peers.

Inclusivity

Open inquiry, freedom of expression, and respect for difference are fundamental to a comprehensive and dynamic education. We are committed to upholding these ideals by encouraging the exploration, engagement, and expression of divergent perspectives and diverse identities.

Duty to Report

As an instructor, one of my responsibilities is to help create a safe learning environment for my students and for the campus as a whole. As a member of the university community, I have the responsibility to report any instances of sexual harassment, sexual violence and/or other forms of prohibited discrimination. If you would rather share information about sexual harassment, sexual violence or discrimination to a confidential employee who does not have this reporting responsibility, you can find a list of those individuals here <https://safe.uoregon.edu/services>

Campus resources to support your learning

Physics Drop-In Help Center

Free, drop-in help is available in room B010 of the Science Library starting the second week of classes. The schedule will be available on Canvas.

Tutoring and Learning Center (TLC)

Drop-in math and writing support in addition to tutoring, study skills support, and Class Encore. Located in the 4th Floor Knight Library (541) 346-3226, tlc@uoregon.edu

Counseling Center Call anytime to speak with a therapist who can provide support and connect you with resources. Located on the 2nd Floor of the Health Center (541)346-3227

Accessible Education Center Provides supports for support student instructional accommodations. If there are aspects of the instruction or design of this course that result in barriers to your participation, please contact me so together we can strategize how you can get the most out of this course. AEC located on the 1st Floor of Oregon Hall (541) 346-1155, uoac@uoregon.edu

Center for Multicultural Academic Excellence (CMAE) mission is to promote student retention and persistence for historically underrepresented and underserved populations. We develop and implement programs and services that support retention, academic excellence, and success at the UO and beyond. We reaffirm our commitment to all students, including undocumented and tuition equity students. Located on the 1st Floor of Oregon Hall (541) 346-3479, cmae@uoregon.edu

Tentative Course Schedule

Dates	Topic	Reading and Assignments Due
Week 1		
4/2-4/4	The Process of Science	Read: Chapter 1 Due: RQ1 (due 11:59pm Wed 4/3 on Mastering)
Week 2		
4/9-4/11	Vibrations and waves	Read: Chapter 16 Due: RQ2 (4/8), HW1 (due 9:45am Tue 4/9) RQ3 (4/10) MP1 (due 5pm Fri on paper in homework box or via email)
Week 3		
4/16-4/18	Properties of Light EXAM 1 Thurs 4/18	Read: Chapter 26 sections 26.1 – 26.3 Due: RQ4 (4/15), HW2 (4/16)
Week 4		
4/23-4/25	Properties of Light, Reflection and Refraction	Read: Chapter 26 (26.4 - 26.8) Chapter 28 (28.1 – 28.2) Due: RQ5 (4/22), HW3 (4/23), RQ6 (4/24), MP2 (4/26)
Week 5		
4/30-5/2	Reflection and Refraction Ray Diagrams	Read: Chapter 28.3 – 28.6 Due: RQ7 (4/29), HW4 (4/30), RQ8 (5/1)
Week 6		
5/7-5/9	Application of Lenses EXAM 2 Thurs 5/9	Read: Chapter 28.3 – 28.6 Due: RQ9 (4/29), HW5 (5/7), MP3(5/10)
Week 7		
5/14-5/16	Color, Color mixing and filters	Read: Chapter 27 Due: RQ10(5/13), HW6(5/14), RQ11(5/15)
Week 8		
5/21-5/23	Color, Light Waves Light Waves	Read: Chapter 29 Due: RQ12(5/20), HW7(5/21), RQ13(5/22), MP4(5/24)
Week 9		
5/28-5/30	Incandescence, Fluorescence, LEDs EXAM 3 Thurs 5/30	Read: Chapter 30 Due: RQ14 (5/27), HW8 (5/28)
Week 10		
6/4-6/6	Photoelectric Effect	Read: Chapter 31 Due: RQ15 (6/3), HW9 (6/4), RQ16 (6/6), MP5 (6/7)

RQ = Reading Questions, these assignments are due via Mastering by midnight the day BEFORE class meetings not devoted to exams.

HW = Homework Sets, these assignments are due via Mastering BEFORE class on Tuesdays. The deadline is set for 9:45am Tuesdays.

MP = Mini-projects, aka “Think and Do” activities from text, these assignments are due every other Friday by 5pm. Hardcopies can be turned into the Homework box in the basement of Willamette Hall, alternatively they can be turned in via email.