

## LEARNING GOALS AT THE END OF THE COURSE, YOU SHOULD BE ABLE TO:

1. **Appreciate the beauty** in optics, including the nature of light and the nature of vision and perception.
2. **Appreciate the role that physics plays** in deepening our understanding of the world, particularly in terms of optics.
3. **Cultivate and explore your own curiosity** about optical phenomena, including the ability to make observations, wonder about something, and propose further explorations to better understand it.
4. **Analyze a scientific argument:** Identify the claim that is being made, the evidence or data which supports it, and the reasoning (or "warrant") that connects the two.
5. **Generate a scientific argument:** Indicate the evidence or data which supports that claim, and the reasoning (or "warrant") that connects the data to the claim.
6. **Explain the physics** behind both everyday and unusual optical phenomena without relying on complicated mathematics.
7. **Predict, using words and/or numbers as appropriate, what will be observed** when given a particular situation (such as a light source, image formed by lenses, observing an object reflected in mirrors, the color that is perceived under certain situations).
8. **Make numerical predictions accurately:** Be able to identify the appropriate algebraic equation, rearrange it to solve for the desired variable, and solve.
9. **Reflect on your work and learning in the course,** and help others to do the same – do you know what you are solving and why? Are you achieving the goals of the course? How do these ideas relate to your life or major? Are there areas where you need additional feedback or assistance to succeed?
10. **Apply principles used in the class** to your everyday life and/or your field of study.

### Assessments to test achievement of learning goals

1. **Written work.** Can the student communicate clearly, including arguing a point using claims and evidence? Can the student communicate where they find beauty and utility in these ideas?
2. **Factual testing.** Can the student recognize and use key ideas in the course?
3. **Observation and noticing.** Can the student observe phenomena and identify relevant or interesting details? Can they notice aspects of phenomena that relate to the ideas of the class, making sense of "messy" observations by pulling out relevant details?
4. **Interpreting phenomena.** When given a phenomena or situation, can the student explain what is going on using principles from the class? Can she choose the appropriate principle which relates to the situation? When given a situation, can the student predict what will be observed, using principles from the class?
5. **Questioning and testing** (i.e., experiments). When given a situation, can the student identify things that pique their curiosity, and devise things that they might test or try to understand it better?
6. **Problem solving.** Can the student make accurate numerical predictions, including choosing the appropriate equation and carrying it through? Can the student reflect on their own learning?
7. **Peer feedback,** including group review, group exams, peer instruction. Can the student give and receive feedback from peers to help one another reflect on their learning and help each other learn?