PHYS 101 Light and Visual Phenomena

Sections 1-4 (RRO 125): MW: 2-3:15 pm.
The Combination *PHYS 101/121* has no prerequisites.
This combination meets the Lab Science Core Curriculum and LAC requirement

Instructor: James Perkins, Ph.D.; jperkins@unca.edu
Text: Online. **You need Internet access with Google Chrome.**
The textbook is free and at our website.
UNCA Professor Emeritus Dr. Michael "Doc" Ruiz authored both the online course website and textbook.
Website: http://www.opus.unca.edu/light/
To sign up, click the First Log-In link

January 2026

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1	2	3
4	5	6	7	8	9	10
11	12 A. Reflection	13 L01. Powers of Ten	14 B. Refraction	15	16	17
18	19 MLK Jr. Holiday	20 L02. The EM Spectrum	21 C. E&M Waves	22	23	24
25	26 D. Light and Matter	27 L03. Spectrsocopy	28 E. EM Spectrum	29	30 1st Project Due	31

February 2026

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5	6	7
8	9 F. Light and Life	10 L04. Color Addition	11 G. Color	12	13	14
15	16 H. Color Mixing	17 L05. Color Subtraction	18 I. Shadows	19	20	21
22	23 J. Plane Mirrors	24 E1. Exam 1 A-G	25 K. Spherical Mirrors	26	27	28
	2 L. Lenses	3 LE1 Lab Exam 1 Labs 1-5	4 M. Dispersion and Aberrations			

Class Responsibilities and Resources

1. **Online Text:** http://www.opus.unca.edu/light/ Assignments are done online.
2. **Clickers:** In class we'll respond to questions through ttpoll.com or with PointSolutions app.
3. **Homework:** Due 11:59 pm Friday night. Instructor support is limited after 12 pm Friday.
4. **Projects:** From 6 choices choose 4 from simulations or real world. Due 1/30, 3/13, 4/10, 5/7.
5. **Office Hours:** I am in RRO 114 or 124D: T 9-9:55 and by appointment
6. **Attendance (70):** You can miss 2 classes, but there is a bonus (10) for attending all classes.

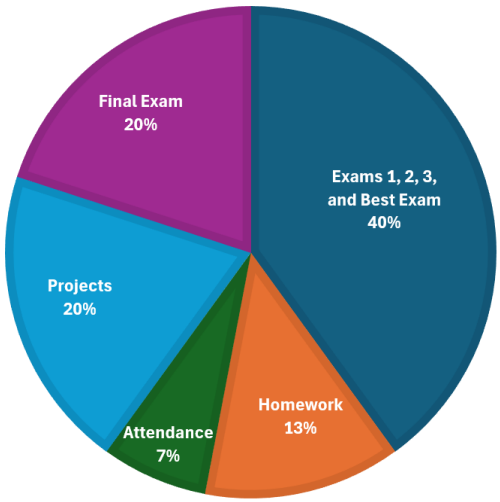
   You may contact me by email for instructions make up missed classes.
7. **Foreseeable Absences:** See me 2 weeks prior to make arrangements for missing a class.
8. **Unforeseeable Absences:** See me within a week to make up a missed class.
9. **Peers:** You are encouraged to work together on homework, start a Discord or a study group.

   All work should be (1) in your own words and (2) representative of your own understanding.
10. **Tutorials:** See the tutorial section in the etext for helpful tutorials made by Doc.
11. **Extra Credit:** Do questions in the text up until May 6.

March 2026

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5	6	7
8	9 N. Atmospheric Effects	10 No Lab	11 O. Cameras	12	13 2nd Project Due	14
15	16	17	18	19	20	21
	Spring Break					
22	23 P. Stops and Exposures	24 L06. Color Wheels	25 Q. Camera Lenses	26	27	28
29	30 R1. Film	31 E2. Exam 2 H-N	1 R2. Film and Sensors			
	6 S1. The Eye					

Last day to withdraw from a full semester class is Wednesday, March 20, 2026.



Grading (This course typically has a class grade point average in the 2.6 to 2.8 range).

100	Exam 1 aka E1
100	Exam 2 aka E2
100	Exam 3 aka E3
200	Final aka FN
100	Best Exam Percentage
130	Web Homework (Due Weekly)
200	Four Projects (50 points each)
70	Attendance (-5 per miss after 2 free)
1000	**Total** (No ± Grades, See Below)

A (900-1000) - apply knowledge in new areas
B (800-899) - apply knowledge in familiar areas
C (700-799) - apply knowledge in easy areas
D (600-699) - misconceptions in principles
F (0-599) - serious gaps in understanding

PHYS 101: E1, E2, E3 are 50 multiple choice (75 minutes); FN is 100 multiple choice (150 min).

PHYS 121: LE1 and LE2 are 50 multiple choice (75 minutes). LE2 is taken during Finals Week.

Bonus and Borderline: If you attend all classes you get a 10-point bonus. If your grade is borderline, I will consider helping you if you come to class, pay attention, put in effort with homework and extra credit. For very close cases I will also look for a strong Final.
Though errors rarely occur, check your grades regularly and report anything you believe to be inaccurate **within the following week**.

Student Learning Objectives: Students should be able to explain in their own words common behaviors and properties of light, connect every-day and extraordinary observations of light and visual phenomena to the underlying physical principles, use graphs to visually describe light phenomena, and recall important light/art/photography innovations and experiments.

April 2026

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		31 L07. Camera Lenses	1 S2. Eye Glasses	2	3	4
5	6 T. Perception	7 L08. Eye Lenses	8 U. Color Perception	9	10 3rd Project Due	11
12	13 V. Cognitive Illusions	14 L09. Color Perception	15 W. Optical Instruments	16	17	18
19	20 X. Luminescence	21 L10. Optical Illusions	22 Y. Einstein and Light	23	24	25
26	27 Z. Quantum Optics	28 E3. Exam 3 O-U	29 Reading Day	30		

How to Succeed in Light Class

1. Time. Reserve at least 2 hours (reading, study, web apps, multimedia, assignments, etc.) for every hour of class. This time is at least 6 hours per week in addition to class time. If you are a full-time student and have a job, ask Dr. Perkins for some time management tips

2. Instructor. Drop by weekly during office hours. If you have any problems, come talk to me.

3. Peers. Ask your classmates for help, e.g., before and after class or lab are good times to meet with a study group. Ask me if you'd like help scheduling a study group! You master the material when you are challenged to explain it to someone else.

Come to every class and take notes. Do not fall behind! Science classes build on previous classes. Use our “Exam Practice”, where you see actual exam questions. If you spend lots of time with “Exam Practice” you will virtually see all the possible questions that can be on your exams. But the best advice is to first carefully study the solutions to old exams.

The Friday Rule: If you wait until the due date (Friday), there is no guarantee that the instructor will be available for support, no matter what problems arise, including computer difficulties. However, there will be at least one Grace Period near the end of the semester in order to make up some missed assignments.

May 2026

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1 FE and LE2 11:30am- 5:30pm	2
3	4 FE and LE2 8am- 2pm	5 FE and LE2 8am- 2pm	6 FE and LE2 8am- 5:30pm	7 4th Project Due	8	9

Art in PHYS 101, I-ARC, and *CNN*

The course features an artist this semester: Élisabeth Louise Vigée Le Brun (1755-1842). Our website includes a special gallery of 60 of her portraits. I encourage you to bring your own favorite art, viral videos, or photographs to this course. We will have extra credit opportunities to view them and analyze them using the language and techniques of this class.

The objective of ***Light and Visual Phenomena*** is a liberal-arts science course for non-majors. It includes the biology of the eye, medical prescription of eyeglasses, psychology of perception, optical illusions, photography, magic, color in art, and inventions. You will appreciate light and its many applications and expressions in the world.

This course we designed based on the *UNCA* I-ARC model: Inquiry (understanding the question or problem at hand), Apply (using the appropriate principle, law, or formula), Reflect (reflecting on the answer to verify its validity), and Communicate (finally giving the answer with confidence with proper units and significant figures).

Our textbook was a top science/technology news story on *CNN: E-Book Learning*, which aired on *NEXT@CNN*, August 31, 2002.

You can bookmark www.opus.unca.edu/light_2024

UNCA-WIDE Important Information

Title IX and Sexual Misconduct. UNC Asheville is dedicated to cultivating and maintaining a safe, respectful, and inclusive environment, free from harassment and discrimination. We strive to ensure that all have equal access to the educational and employment opportunities the University provides. If you or someone you know has been affected by sexual or gender-based harassment, including sexual assault, dating or domestic violence, or stalking, please know that help and support are available. UNC Asheville strongly encourages all members of the community to take action, seek support, and report incidents of sexual harassment to the Title IX Office. You may contact the Title IX Office or Heather Lindkvist, the Title IX Coordinator, directly at 828.232.5658 or at titleix@unca.edu or learn more by visiting titleix.unca.edu. .
As a faculty member, I am a "responsible employee" and private resource. This means that if you share any information or discuss an incident with me regarding sexual or gender-based harassment, I must disclose this information to the Title IX Coordinator. Our goal is to ensure you are aware of the range of options available to you and have access to the resources you may need.
If you wish to speak with a confidential resource, contact University Health and Counseling Services at 828.251.6520. Off-campus confidential resources include Our Voice (24-Hour Hotline at 828.255.7576) and Helpmate (24-Hour Hotline at 828.254.0516).

Office of Academic Accessibility. UNC-Asheville values the diversity of our student body as a strength and a critical component of our dynamic community. Students with disabilities or temporary injuries/conditions may require accommodations due to barriers in the structure of facilities, course design, technology used for curricular purposes, or other campus resources. Students who experience a barrier to full access to this class should let the professor know, and/or make an appointment to meet with the Office of Academic Accessibility as soon as possible. Learn more about the process of registering, and the services available through the Office of Academic Accessibility here: accessibility.unca.edu Please use this link https://universityofncasheville.setmore.com/ to schedule an appointment. While students may disclose disability at any point in the semester, students who receive Letters of Accommodation are strongly encouraged to request, obtain and present these to their professors as early in the semester as possible so that accommodations can be made in a timely manner. It is the student's responsibility to follow this process each semester.

Early Alerts. Faculty at UNC Asheville are required to use the university's Academic Indicator (AI) system. The purpose of this system is to communicate with students about their progress in courses. Academic Indicators can reflect that a student's performance is satisfactory at the time the indicator is submitted or they can indicate concerns (e.g., academic difficulty, attendance problems, or other concerns). Professors use the AI system because they are invested in student success and want to encourage open conversations about how students can improve their performance. When a faculty member submits an indicator that expresses a concern, the student receives an email from Academic Advising notifying them of the indicator. If a student receives three or more indicators, they will need to meet with a professional advisor by scheduling an

appointment using the online appointment service at advising.unca.edu and select 'Academic Indicator Appointment' as the type of appointment. The instructor may also request to meet with the student to discuss the indicator. It is in the student's best interest to complete the process quickly, as students who do so are more likely to earn credit for the course. Questions about the Academic Indicator system can be directed to Anne Marie Roberts (amrober1@unca.edu) in the Academic Success Center.

Academic Dishonesty. The university's policy on academic honesty states that "As a community of scholars dedicated to learning and the pursuit of knowledge UNC Asheville relies on the honesty and academic integrity of all the members of its community. Any act of plagiarism or cheating is academic dishonesty. A person who knowingly assists another in cheating is likewise guilty of cheating. According to the instructor's view of the gravity of the offense, a student may be punished by a failing grade or a grade of zero for the assignment or test, or a failing grade in the course. If it seems warranted, the instructor may also recommend to the Provost dismissal or other serious university sanction." I expect that you will exercise integrity in all quizzes, exams, and written assignments. Please email me or pop in during student hours if you have additional questions or need clarification on any point. Note that any violations of academic dishonesty (cheating, signing someone else's quiz sheet, etc.) must be reported to the Provost's Office. While I do encourage students to work together on homework assignments and labs. All work submitted must be: 1) in your own words, and 2) representative of your own understanding.

Special Policies.

The course will be offered this semester in a standard, in-person modality. Fortunately, we have several options in the case that a student needs to miss a class. If you are feeling ill, please stay home and contact me by email to request information on how to make up the class without penalty to your grade (typically by watching a video and completing a short assignment).

This syllabus is subject to change. Any substantive changes will be communicated through email.