

Phys 323 Syllabus Fall 2020

Physical Optics

T Th 1:15- 2:30 PM

Modality, Meeting Pattern, Location

All students meet with the instructors **in-person** two times a week, **TTh 1:15-2:30 PM in Innovation E330**.

Instructor Name, Contact Information, Office Hours

Madalina Furis

E225 Innovation Hall

Madalina.Furis@uvm.edu

Office Hours: **TBA once instructor schedule is finalized on Feb 1st**

Technical support for students

Students, please read this technology check list to make sure you are ready for classes.

<https://www.uvm.edu/it/kb/student-technology-resources/>

Students should contact the Helpline (802-656-2604) for support with technical issues.

Course Description

This course is designed to provide Physics, Chemistry, Engineering and Materials science graduate students with a practical understanding of several optical phenomena: electromagnetic nature of light, polarization, interference, diffraction and Fourier optics and the quantum nature of light. The course will end with modern topics such as ultrafast lasers, light emitting diodes detectors and nonlinear optics. A review of geometrical optics with an introduction to Jones matrices is included. The instructor is an expert in electronic properties of materials, interaction of light with matter, optical instrumentation, ultrafast lasers, and materials behavior in very high magnetic fields. Her approach will be to provide students with an in-depth physics perspective on very useful, applied topics that students can take with them in their future careers. Such topics include the Fabry Perot laser cavities, designing a grating spectrometer, using polarization optics in studies of interaction of light and matter, optical device physics.

Course Learning Objectives

After completing this course, the student will be able to:

- Use the matrix formalism for ray tracing
- Use the Jones matrices to characterize polarized light
- Describe diffraction gratings and design a basic grating monochromator
- Describe modes in a laser cavity
- Design a spectroscopy experiment
- Understand the basic functioning of optical devices

Outline

The students meet with the instructor two times a week in-person. Students are required to complete textbook reading assignments before coming to class. The class will observe a lecture-by lecture calendar available in Blackboard. The instructor will create a Piazza discussion forum where students can post questions and communicate with the instructor and the colleagues about the course. Homework will be assigned weekly for credit. There is one midterm and one cumulative final exam. Every Thursday one student will give a ten-minute presentation on a concept or paper encountered in reading about the material, directly connected to the topic studied in class.

Required Course Materials:

Introduction to Modern Optics, by Grant Fowles, Dover Publications

Additional Readings: *The Light Fantastic* by Ian Kenyon, *Modern Classical Optics* by Geoffrey Brooker , additional select chapters provided by instructor

Blackboard, MS Teams, or other course sites:

All students must have access to **Blackboard** and a student account in **Piazza**. The latter is a free online discussion and homework forum that is integrated with Blackboard (and oh, so much better!). You can create an account by following the link under **Physical Optics Forum** in **BB**. You must also have a scanning app on your phone or tablet. You will submit your homework electronically.

All office hours will be scheduled and take place via Teams.

Attendance Policy and Classroom Environment Expectations:

You are expected to attend all lectures in -person. The class will observe a lecture-by-lecture calendar available in Blackboard. Homework will be assigned weekly for credit. There is a one mid term and a final exam, all closed book. Each Thursday a student will give a ten minutes presentation about a paper or a concept relevant to the topic discussed that week in class. These presentations will count for 20% percent of the grade.

“The [Green and Gold Promise](#) clearly articulates the expectations that UVM has for students, faculty, and staff to remain compliant with all COVID-19 recommendations from the federal CDC, the State of Vermont, and the City of Burlington. This include following all rules regarding facial coverings and social distancing when attending class. If you do not follow these guidelines, I will ask you to leave the class. If you forget your mask, you cannot enter the class and should go back and retrieve your mask. The [Code of Student Conduct](#) outlines policies related to violations of the Green and Gold Promise. Sanctions for violations include fines, educational sanctions, parent notification, probation, and suspension.”

Attendance and illness/isolation/quarantine:

Some of you may need to isolate during the semester. In that case, the lecture will be streamed live and also recorded on Teams. **Advance notification is required, since lectures are not streamed by default for in-person classes.**

Grading Criteria/Policies:

- Homework 40%
- Presentations 20%
- Midterm Exam: 15%
- Final Exam: 25%

Grading scale: A-range > 85% B-range: 70% - 84% C-range: 55% - 69%

Assessments (Graded Work):

- Written homework assignments will be due two days after the relevant chapter is discussed in class. (see calendar). The assignments will be scanned and uploaded electronically using the homework link in BB.
- The mid-term exam will be closed book, taking place during class time. The final will be a closed book 3-hour exam scheduled according to the Spring Exam Matrix.

Research and Citation Help

For help selecting research topics, finding information, citing sources, and more, ask a librarian. Although we're working remotely, we're eager to help. You may ask questions by phone, e-mail, chat, or text, or make an appointment for an individual consultation with a librarian.

Howe Library: <https://library.uvm.edu/askhowe>

Dana Medical Library: <https://dana.uvm.edu/help/ask>

Silver Special Collections Library: <https://specialcollections.uvm.edu/help/ask>

Course Evaluation:

All students are expected to complete an evaluation of the course at its conclusion. The evaluations will be anonymous and confidential, and the information gained, including constructive criticisms, will be used to improve the course.

COVID 19 Policy section

<http://catalogue.uvm.edu/>

The University of Vermont reserves the right to make changes in the course offerings, mode of delivery, degree requirements, charges, regulations, and procedures contained herein as educational, financial, and health, safety, and welfare considerations require, or as necessary to be compliant with governmental, accreditation, or public health directives.

Green and Gold Promise:

The [Green and Gold Promise](#) clearly articulates the expectations that UVM has for students, faculty, and staff to remain compliant with all COVID-19 recommendations from the federal CDC, the State of Vermont, and the City of Burlington.

The [Code of Student Conduct](#) outlines policies related to violations of the Green and Gold Promise. Sanctions for violations include fines, educational sanctions, parent notification, probation, and suspension.

Intellectual Property Statement/Prohibition on Sharing Academic Materials:

Students are prohibited from publicly sharing or selling academic materials that they did not author (for example: class syllabus, outlines or class presentations authored by the professor, practice questions, text from the textbook or other copyrighted class materials, etc.); and students are prohibited from sharing assessments (for example homework or a take-home examination). Violations will be handled under UVM's Intellectual Property policy and Code of Academic Integrity.

Tips for Success (optional):

Course-specific study/preparation tips

Here are a few resources for students on remote/online learning:

- Checklist for success in <https://learn.uvm.edu/about/support-for-students/checklist-online-credit-courses/>
- Academic support for online courses:
<https://www.uvm.edu/academicsuccess/online-learning-student-resources-remote-instruction>
- 30-minute webinar on online learning success (Mar 2020):
https://www.youtube.com/watch?v=Xp_MYsqQyvE

Helpful resources other than the professor (e.g. [Undergraduate/Graduate Writing Center](#), [Supplemental Instruction](#), [Learning Co-op tutors](#), supplemental course materials)

Student Learning Accommodations:

In keeping with University policy, any student with a documented disability interested in utilizing ADA accommodations should contact Student Accessibility Services (SAS), the office of Disability Services on campus for students. SAS works with students and faculty in an interactive process to explore reasonable and appropriate accommodations, which are communicated to faculty in an accommodation letter. All students are strongly recommended to discuss with their faculty the accommodations

they plan to use in each course. Faculty who receive Letters of Accommodation with [Disability Related Flexible accommodations](#) will need to fill out the Disability Related Flexibility Agreement. Any questions from faculty or students on the agreement should be directed to the SAS specialist who is indicated on the letter.

Contact SAS:

A170 Living/Learning Center;

802-656-7753

access@uvm.edu

www.uvm.edu/access

Important UVM Policies

Religious Holidays:

Students have the right to practice the religion of their choice. If you need to miss class to observe a religious holiday, please submit the dates of your absence to me in writing by the end of the second full week of classes. You will be permitted to make up work within a mutually agreed-upon time. <https://www.uvm.edu/registrar/religious-holidays>

Academic Integrity:

The policy addresses plagiarism, fabrication, collusion, and cheating.

<https://www.uvm.edu/policies/student/acadintegrity.pdf>

Grade Appeals:

If you would like to contest a grade, please follow the procedures outlined in this policy:

<https://www.uvm.edu/policies/student/gradeappeals.pdf>

Grading:

For information on grading and GPA calculation, go to

<https://www.uvm.edu/registrar/grades>

Code of Student Conduct:

<http://www.uvm.edu/policies/student/studentcode.pdf>

FERPA Rights Disclosure:

The purpose of this policy is to communicate the rights of students regarding access to, and privacy of their student educational records as provided for in the Family Educational Rights and Privacy Act (FERPA) of 1974.

<http://catalogue.uvm.edu/undergraduate/academicinfo/ferparightsdisclosure/>

Promoting Health & Safety:

The University of Vermont's number one priority is to support a healthy and safe community:

Center for Health and Wellbeing:

<https://www.uvm.edu/health>

Counseling & Psychiatry Services (CAPS)

Phone: (802) 656-3340

C.A.R.E. If you are concerned about a UVM community member or are concerned about a specific event, we encourage you to contact the Dean of Students Office (802-656-3380). If you would like to remain anonymous, you can report your concerns online by visiting the Dean of Students website at

<https://www.uvm.edu/studentaffairs>

Final Exam Policy:

The University final exam policy outlines expectations during final exams and explains timing and process of examination period. <https://www.uvm.edu/registrar/final-exams>

Alcohol and Cannabis Statement:

The Division of Student Affairs has offered the following statement on alcohol and cannabis use **that faculty may choose to include, or modify for inclusion,** in their syllabus or Blackboard site:

Statement on Alcohol and Cannabis in the Academic Environment

As a faculty member, I want you to get the most you can out of this course. You play a crucial role in your education and in your readiness to learn and fully engage with the course material. It is important to note that alcohol and cannabis have no place in an academic environment. They can seriously impair your ability to learn and retain information not only in the moment you may be using, but up to 48 hours or more afterwards. In addition, alcohol and cannabis can:

- Cause issues with attention, memory and concentration
- Negatively impact the quality of how information is processed and ultimately stored
- Affect sleep patterns, which interferes with long-term memory formation

It is my expectation that you will do everything you can to optimize your learning and to fully participate in this course.