# University of Southern Maine — Dept. of Physics

## Physics 375 Syllabus

— Optics —

Spring 2019

**Instructor**

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Department of Physics — **Office Hours:** By Appt.
Portland Campus

**Course Description:** This course on optics discusses the nature of light in both the geometrical optics limit and the physical optics limit. We discuss how physicists have come to "understand" light; or more appropriately, how light appears to behave. This course assumes a good familiarity with calculus and uses differential equations and other tools as needed to model the behavior of light.

**Textbook:**

Optics, 5th edition
Eugene Hecht. Peason. This is our main text for the course, and we'll follow along through selected portions of the first 10 chapters (as time allows!)

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OTHER REFERENCES

Fundamentals of Optics
Francis A. Jenkins & Harvey E. White
This is a classic text, any edition is a fine reference; out of print, but used copies are available online.

Introduction to Classical and Modern Optics, 4th ed
Jurgen R. Meyer-Arendt, Prentice-Hall

Introduction to Optics, 2nd ed.
Frank L. Pedrotti, S.J., and Leno S. Pedrotti, Prentice-Hall

The Feynman Lectures on Physics
Richard P. Feynman, Addison-Wesley, 1964 (an EXCELLENT reference)

**Atendance Policy:**

I expect that everyone will be at every class except in extenuating circumstances. If I find that you are missing class too often (i.e. more than three times), you can expect that I will talk with you and that you will likely receive a lower grade for the course, or asked to leave if this repeated absence is coupled with poor quality work written work. If you miss a class in which a test is given, you will not be given a makeup except in truly *exceptional* cases or if you have prearranged due to a conflict.

**Outside Help/Office Hours:**

In general, if my office door is open, I am happy to help you, so feel free to stop in and ask questions.

**Assessment**

I am obligated to assign a letter grade for each person enrolled in this course. This grade will best reflect my *subjective* sense of your level of understanding of the physics we discuss in this class. In addition, I will base this on your performance on 2 exams, Weekly problem sets, and a comprehensive final exam as follows:

| | | |
|---|---|---|
| Exam # 1 | Thursday, 22 Feb, 2019 | 100 pts |
| Exam # 2 | Thursday, 18 Apr, 2019 | 100 pts |
| Problem Sets | Roughly weekly | 600 pts |
| Final | Thusday, 9 May, 2019: 8 am - 10am | 200 pts |
| | **Total Points** | **1000** |

**Important note on problem sets:**

I encourage you to neatly handwrite your problem set solutions. Neatness and legibility count. In addition, your solutions should be written as if the audience is a student at another university optics course looking for help in understanding the solution to the problem. As such, you should *lead the reader through the solution by appealing to relevant physical principles* and you should write in grammatically correct english. The well written problem set will read like an excellent solution manual, with textual descriptions interspersed with important mathematical equations (as well as pictorial and graphical descriptions when needed) placed on a separate line, centered on the page. *A problem set solution with only mathematical equations and no narrative description will receive at most 70% credit.*

**** Late problem sets will lose 50% per day late.**

**Grading Scale**

| A | A- | B+ | B | B- | C+ | C | C- | D | F |
|---|---|---|---|---|---|---|---|---|---|
| 930-1000 | 890-929 | 870-889 | 830-869 | 790-829 | 770-789 | 730-769 | 690-720 | 600-689 | 0-599 |

**Detailed Reading and Assignment Schedule**

The schedule below is tentative, although I will keep the exam dates fixed.

| Date | Reading | Events |
|---|---|---|
| 22 Jan | 1.1–1.5 & 2.1–2.6 | |
| 24 Jan | 2.7-2.10 | |
| 29 Jan | 3.1–3.3 | |
| 31 Jan | 3.4 – 3.7 | |
| 05 Feb | finish Ch 3 | |
| 07 Feb | 4.1–4.5 | |
| 12 Feb | 4.6–4.7 | |
| 14 Feb | 4.8–4.11 | |
| 19 Feb | 5.1-5.2 | |
| 21 Feb | EXAM 1 | **EXAM 1** |
| 26 Feb | 5.3 -5.6 | |
| 28 Feb | 5.7–5.9 | |
| 5 Mar | no class | (At APS March Meeting) |
| 7 Mar | 6.1–6.2 | |
| 12 Mar | 6.1–6.2 | |
| 14 Mar | 6.3–6.4 | |
| 19 Mar | No Class | Spring Break |
| 21 Mar | No Class | Spring Break |
| 26 Mar | 7.1-7.2 | |
| 28 Mar | 7.3–7.4 | |
| 2 Apr | 8.1–8.4 | |
| 4 Apr | 8.5–8.11 | |
| 09 Apr | 9.1–9.3 | |
| 11 Apr | 9.4–9.6 | |
| 16 Apr | 9.7–9.8 | |
| 18 Apr | EXAM 2 | **EXAM 2** |
| 23 Apr | 10.1 - 2 | |
| 25 Apr | 10.2-10.3 | |
| 30 Apr | 10.3 –10.4 | |
| 2 May | topic in Ch 11 | |
| 9 May | **FINAL EXAM** | 8–10 am |