

Spring 2012

# Physics of Lasers and Modern Optics

Physics and Astronomy 343

Course Syllabus and Information Sheet

**Instructor:** Stephen Ducharme Office: 310F Jorgensen Hall, 472-8590

sducharme1@unl.edu Hours: Drop-in or by appointment

**Web Site:** On my.unl.edu, select LASERS & OPTICS PHYS343 SEC 150 SPRING 2012

**Prerequisite**—Phys 212 or 142 + a laboratory course in science or engineering.

**Classroom**—233 Jorgensen Hall

**Text**—[Online Manual](#), Hand-outs, and In-lab reference materials

**Lab Notebook**—60-sheet 5 by 5 quad 10 1/8 by 7 7/8 inches. Buy *2 identical* notebooks.

**Lectures**—One hour per week as arranged. Attendance *required*.

**Laboratory**—Three hours per week as arranged. Attendance *required*.

**Grades**—Two quizzes (10 %), laboratory preparation and notebooks (35 %), two formal reports (50 %), one oral report (5 %). No final exam (Yay!).

## SCHEDULE:

| Week                         | Exp.     | Title   | Assignment           | Due *   |
|------------------------------|----------|---|----------------------|---------|
| Jan. 9-13                    | -----    | First Meeting and Lecture 1, time day TBD<br>No lab this week | Schedule &<br>Survey | Jan. 10 |
| Jan. 16-20                   | <b>1</b> | Laser Safety  | Quiz 1               | In Lab  |
| Jan. 23-27<br>Jan. 30-Feb. 3 | <b>2</b> | Optical Detectors<br>(Subject of Formal Report 1)             |                      |         |
| Feb. 6-10<br>Feb. 13-17      | <b>3</b> | Basic Laser Operation   | Quiz 2               | In Lab  |
| Feb. 20-24<br>Feb. 27-Mar. 2 | <b>#</b> |   | Formal 1             | Mar. 1  |
| Mar. 5-9<br>Mar. 12-16       | <b>#</b> |   |                      |         |
| Mar. 26-30<br>Apr. 2-6       | <b>#</b> |   |                      |         |
| Apr. 9-13<br>Apr. 16-20      | <b>#</b> |   |                      |         |
| Apr. 23-27                   | —        | No lecture or lab., oral reports Schedule TBA                 | Formal 2             | May 5   |

# An Experiment of your choice, selected from the master list in the [Online Manual](#) Introduction.

\* Formal Reports are due in my office by 5 PM on the specified date. Late reports lose 4% per weekday thereafter. Formal Report 1 to be done on Experiment 2. Formal Report 2 to be done on one of the 4 Experiments labeled #. The subject of Formal Report 2 must be selected by April 13th.

## *Schedule of Lectures–Spring 2012*

(lectures meet at 11:30 AM, attend all lectures that cover your chosen experiments)

| <b>Mo.</b> | <b>Day</b> | <b>Expt. #</b> | <b>Title</b>                                     |
|------------|------------|----------------|--|
| JAN        | 13         | 1              | Intro, Safety                                    |
|            | 26         | 2              | Photodiodes                                      |
| FEB        | 2          | 2              | PMTs   |
|            | 9          | 3              | Lasers   |
|            | 16         | 3              | Stimulated Emission, “The Heart of Diocles” Tour |
|            | 23         | 7              | Fiber Optics                                     |
| MAR        | 2          | 5              | Polarization                                     |
|            | 9          | 8              | Diode Lasers                                     |
|            | 16         | 6              | Gaussian Beams                                   |
|            | 30         | 11             | Electro-Optics                                   |
| APR        | 6          | 10             | Holography                                       |
|            | 13         | 13             | Coherence  |
|            | 20         |                | Visit Uiterwaal Ultrafast Lasers lab             |