

PHGN 384

Physics Summer Field Session

May 12 - June 20, 2008

Instructors: Tim Ohno (Coordinator), Uwe Greife, Chuck Stone, David Wood, Fred Sarazin, Alex Flournoy, Orlen Wolf, Brian Zadler, Alex Yuffa, and Larry Peterson

Teaching Assistants: Rachel Miller, Erich Hoover, Jesse Hulbert, Elena Trenholme, Jeremiah Tucker, Jeremy Fields, Matt Heller, Joe Schneiderwind, Nick Brown

Optional Text: Building Scientific Apparatus, J. H. Moore, C. C. Davis, and M. A. Coplan, Perseus Books (Westview), 1989, 3rd ed.

We require a two-copy laboratory notebook on the first day, see the bookstore.

Course Web Page: <http://www.mines.edu/Academic/courses/physics/phgn384>. We will also using LONCAPA this term as the website for grades as well as other information.

Learning Objectives: The objectives of this course are to provide Engineering Physics students a broad spectrum of technical skills needed to design, construct, and test scientific apparatus as well as analyze, display, and report experimental data in a professional manner. Specific skills include vacuum/thin films, electronics, instrumentation, and optical design, machine shop design and fabrication, and a specialized set of computing skills. The emphasis of the course is on realistic hands-on experiences. Detailed module learning objectives will be provided in the modules.

Grading: Each module will be assigned equal weight (22% each, with the remainder of the grade 12% given to the lab notebook and activity specific assignments). However, all modules must be passed to pass the field session.

Module Schedule: The four modules are: (1) Machine Shop Fabrication and Optics, (2) Software for Engineering Physics, (3) Instrumentation and Electronics, and (4) Vacuum and Thin Films. The class will be divided into four groups (Orange, Green, Blue and Purple). Each group has its own schedule, there are a few irregularities related to field trips. The section B students are mostly in the Orange group. At the end of each day know what is tomorrow's plan.

Keeping a lab notebook (courtesy of Matt Young and Frank Kowalski)

Put *all* work, including wild ideas and incorrect calculations, directly into notebook

- Make notebook (and binder) *only* record of project
- Notebook will be graded

Describe your work & record data *as work is performed*

Continuously update a table of contents

- Leave few pages at beginning blank

Real world	Field session
Bound notebook	3-ring binder and double copy lab book
Entries in permanent ink	Pencil OK, pen better
Entries clear, legible, understandable, so co-worker can continue or duplicate	Entries clear, legible, understandable, so co-worker can continue or duplicate
No erasures (strike out with single line)	No erasures (strike out with single line)
Blank space filled with diagonal line	Blank space filled with diagonal line
Each page dated	Each entry or topic dated
Figures, data glued in as necessary	Scotch tape OK, no loose pages in binder
Notebook property of company & left behind	Keep notebook – you may need it in Modern Lab
Notebook restricted to plant	Notebook restricted to Universe
Notes in strict chronological order	Additions OK but preferably dated or in colored ink

Last year there was a large spread in the quality of the field session notebooks, in some cases changing the final grade. We will be evaluating what you write each day. Here are some comments to keep in mind as you take notes.

As you enter information into your notebook, ask yourself the following question. In two years, will I be able to look at my notebook and understand what I did in the shop, electronics, vacuum and optics sections?

If your notebook contains just equations, with no context in which they apply, you probably won't be able to figure out what they mean. The same is true of data you collect.

Just imagine working for a company on a project and then wanting to know something about it a few years later. If you can't understand what you did from your notebook you might as well have not done it. You don't want to be learning this on the job and making the mistakes most beginners make then. Now is the time to practice that skill and let us help you improve.

Don't write every detail of what you have done - keep track of the important issues. In some sections, these will be pointed out in the handouts. You should hole punch handouts and place them in the binders. You can then reference that handout without having to rewrite it in your notebook.