

Physics 121: Course Outline

Winter Quarter, 2012

Website: physics.ucsd.edu/~tmurphy/phys121/

- Week 1: (Jan. 10)
- Course introduction, structure, goals.
 - Machining and mechanical design
 - LAB: SolidWorks Tutorial, and example part design/drawing
 - Properties of materials
- Week 2: (Jan. 17)
- Mechanics of materials: stress and strain; kinematic design
 - LAB: SolidWorks design and analysis of flexure
 - Thermal properties of materials
- Week 3: (Jan. 24)
- Thermal calculations; RTDs; test suite for lab component
 - LAB: construction/testing of thermal enclosures
 - Introduction to geometrical optics
- Week 4: (Jan. 31)
- Raytracing optical systems; C-program for raytracing
 - LAB: Optical raytracing via C-program
 - Vacuum systems and related calculations
- Week 5: (Feb. 7)
- Cryogenics
 - LAB: Cryogenic/Vacuum lab tours
 - AC vs. DC; transmission schemes
- Week 6: (Feb. 14)
- Electronics: loads; diodes & LEDs; transistors; power supplies
 - LAB: Power supply construction/testing
 - Op-amps and their magic rules
- Week 7: (Feb. 21)
- Op-amp applications; digital/analog converter using op-amps
 - LAB: Op-amp circuits & D/A converter construction
 - Computer interfaces: parallel; serial; GPIB; example experiment
- Week 8: (Feb. 28)
- C programming HOW-TO (compilation; prep. for parallel port)
 - LAB: D/A converter from parallel port interface
 - C programming: functions and arrays
- Week 9: (Mar. 6)
- Data streams & parameters; magswipe; flip-flops; other digital goodies
 - LAB: magnetic swipe data stream and packaging to RS-232
 - Data acquisition
- Week 10: (Mar. 13)
- C programming examples of RS-232
 - LAB: magnetic swipe interface via RS-232
 - Things we missed in this course

Final Exam: Thursday, March 22, 3:00 PM; WLH-2114 (classroom)

Grading Scheme

- 80% on lab performance and associated reports
- 20% based on final exam

Required Textbook:

Text: *Building Scientific Apparatus*, 3th or 4th edition, by Moore, Davis, and Coplan

Class Meeting Times:

Lecture: Warren Lecture Hall (WLH) 2114, TTh 2:00–3:20 PM

Lab: Mayer Hall Addition (MHA) 3544/3574, W 2:00–6:00 PM

Professor Contact and Office Hours:

Professor: Tom Murphy

e-mail: tmurphy@physics.ucsd.edu

Phone: 858.534.1844

Office: SERF Building, Room 336 (building number 930)

Hours: Monday 4:00–5:00 PM (e-mail first so I anticipate visit), or by appointment

Teaching Assistant:

TA: Travis Wong

e-mail: tjwrm13@gmail.com

Office: MHA 3544 (lab)

Hours: Monday 10:00–11:00 AM, Tuesday 3:30–4:30 PM