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**Lab Methodology:**

a) In the first 6 weeks, everyone will perform the same Optics experiment (in groups of 2 or 3) every week. In the second six weeks, everyone will perform a different Fiber Optics experiment every week (again in groups of 2 or 3).

b) You will be assigned randomly to groups. While working in groups, all students should make an effort to perform all functions during the course of a lab session (making measurements, taking notes, etc.). All students will be required to make notes and document the experiment in a lab book.

c) Lab runs for three hours. If all experiments are done before the three hours are complete, the students are free to go. If all experiments are not done after the three hours, the students should write-up only what was accomplished during the allotted time (allowances will be made if students prefer to stay somewhat beyond three hours).

d) Each student individually will write-up the experimental details, results, and analysis independently in a lab report to be turned in by the next Friday's class session.

e) Each student’s lab report will be graded individually.

f) **Due to numbers and practicality, missing lab is strongly discouraged and labs cannot be “made-up”!**

g) No late arrivals. After 15 minutes, the door will be closed and no further admission allowed. Participation is critical to the success of these labs and missing the introduction is unacceptable. You will get a “0” for the week.

h) There are no extensions for late lab reports. Lab reports are due after one week and that is it.
Grading:
Grading will be based on three things: keeping a lab book, participation in the work and knowledge of the experiment, and the lab write-up.

2 points: lab book
2 points: participation/knowledge
6 points: lab report
10 points/week

1) Keeping a lab book
Each student will be required to keep a lab notebook devoted to the lab class. During the course of the lab, you should carefully sketch out your experiment, noting important dimensions (distances, volumes, etc.), record the procedure you are following (including mistakes you made in setting something up, and when you moved certain optics) and lastly accurately recording the data taken.

At the end of the lab class, before you leave, you will show the lab book to your instructor, who will grade it. You will receive a “+”, “√”, or “-” based on neatness, accuracy and thoroughness. This will correspond to 2, 1, or 0 points. This grade is 20% of your score.

2) Participation in the work/knowledge of experiment
This grade will be given at the end of the lab based on the instructor’s observations/interactions with the group. All group members will receive the same grade: “+”, “√”, or “-” based on their ability to accurately perform the experiment as described in the lab manual. The lab manual always tells you what to do if you read it carefully! Read the manual before class, and during the lab, to properly perform the experiment. Students/groups who have not read the manual always take more time to perform the experiment and inevitably make more errors prior to “getting things right”. This grade will also reflect the participation of all the group members and how everyone contributes to the lab.

3) Lab report or “write-up”
All experimenters, both scientists and engineers, must be able to communicate effectively. You MUST be able to accurately, concisely, and clearly describe “what you did” and “what result did you see”. This is the essence of a lab report. No set, definitive criteria is provided for a lab report. However, examples of two “A” reports will be provided. A complete report should include (but not be limited to):
- an introduction (one paragraph describing what your impression of the goal of the lab was)
- a section describing the theory involved, any important relevant equations, etc.
- a longish section detailing the actual experiment you did (NOT what was described in the lab manual, but what you actually performed). This should include careful drawings of the apparatus. Be careful, draw accurately, label everything with proper units, etc. Be clear and be concise about what you did.
• a section reporting all the numerical measurements made. This may be “mixed” in with the description of the apparatus if multiple mini-experiments were performed in one lab. It is probably best to keep the experimental details and the resulting measurements together. I will include sheets for summarizing data with each lab manual. Please turn these in with your lab report.

• error analysis. Try to handle the errors and uncertainties in your measurements as completely as possible. **You cannot ignore uncertainty!** See the handout on error analysis.

• a conclusion/discussion. Many, if not most, labs will have some discussion questions at the end which should be addressed in your report.

Hand-sketches and drawings of experimental setups are more than acceptable. I do not expect you to computer draw anything. Graphing of numerical results is BEST if done on a computer, but may be done by hand. Reports may be hand written as well as long as it is clear and legible. If I cannot read it, I reserve the right to not grade it. Sloppiness is unacceptable.

**Computing**

MS Excel has simple graphing functions which are more than adequate for most of what we will do in this lab. However, if you wish to use a more sophisticated package (called Origin), or don’t have access to Excel, please contact me and I will let you in to the Physics Department's computer lab. I would expect this would only take no more than an hour at any one time, usually less to make your computerized graphs. This is a great opportunity to get acquainted with this very popular software.

**Plagiarism**

In each of the last two years I have taught this course, I have had incidents of students taking information – images, descriptions, whole paragraphs – right off the web, cutting and pasting into their lab report. I have caught this every time, as it is usually quite obvious.

If you have never been told, this is plagiarism, a form of academic dishonesty, and is taken very seriously by myself and the University. Most importantly, it is not necessary! I do not want to know what the Web or anyone on it knows. I am trying to figure out what **YOU** know. You must write these lab reports in your own words, and with your own understanding of the ideas and motivations behind the experiment. This includes copying diagrams from my lab manual and putting them into your write-up. I want to see your diagram of the experiment.