MPL PROCEDURES & FORMALITIES

This list itemizes habits and procedures you should adopt in this course. It is not all-inclusive. Use this list as a minimal checklist. The meaning of some items will become more evident as we move through the semester.

Notebooks

1) No loose pages.
2) Summary notes from lab discussions.
3) Questions in handout answered in notebook.
4) Sketch of apparatus (for each step).
5) Description of procedures (for each step).
6) Data tables with units and error bars (and description of how error bars were determined).
7) All graphs have a title, axes with units, and error bars.
8) Analysis procedures and results recorded in notebook.
9) All calculations, including spreadsheets and computer graphs in notebook.
10) Progress reports each week.
11) Light cross out – so you can read what you crossed out.
12) Delineate sections of work (headings, boxes, ...).
13) Cross referencing among data tables, analysis, and graphs … bidirectional.
14) Appropriate use of significant digits.
15) When best fit curve produced
   i) show best fit curve on graph;
   ii) state $\chi^2$;
   iii) state if fit is good.
16) Record all computer file names.
17) Final conclusions written in notebook at the end of the record.

Uncertainties

1) Estimate the uncertainty on each measurement.
2) Compute the uncertainty on each measurement by standard methods.
3) Resolve any difference between 1 and 2.
4) Record process in notebook.

Talks: Slides and Presentation Style

1) Title page.
2) Presentation of title page (paraphrase title).
3) Outline (More than just a list of sections headings?).
4) Page numbers on slides.
5) Use of small illustrations combined with text.
6) Telling axes on graphs.
7) Explanation of equations.
8) Choice of material: theory must be clear.
9) Choice of material: experimental technique explained.
10) Choice of material: data analysis steps explained.
11) Choice of material: discussions and conclusions.
12) No sentences on slides.
13) Informative titles on slides.
14) Amount of material on slides: not overdense.
15) Use of guides to the eye on slides: arrows, boxes, consistent formats…
16) Neatness.
17) Summary slide (More than just a list of sections?).
18) Ended with final message: “this is what we achieved”.
19) Tell us 3 times: overview, details, summary.
20) Questions: content of answers appropriate.
21) Questions: style in answering.
22) Use of screen pointer and audience eye contact.
23) Body language.
24) Clarity and volume of speech.
25) Overall items:
   i) Is all the physics correct?
   ii) Is each point made clearly?
   iii) Is a compelling argument made?

Close-Out Talks
1) Complete all analysis before the summary talk.
2) Complete the reverse outline before the summary talk.
3) Have rough drafts of all graphs and values for all numbers that justify your conclusions available for the talk.

Article Outlines
1) Use your reverse outline as a guide.
2) Force precise statement of conclusions.
3) Keywords and phrases suffice: sentences not necessary.
4) Include actual graphs.
5) 1.5 to 2 pages of writing.

Scientific Articles
1) Double spaced, single sided, with page numbers.
2) 5 sections with headings written out.
   a) Abstract (1 paragraph: What done; method; specific conclusions).
   b) Introduction (with “road map” at end).
   c) Apparatus and Procedures.
   d) Results.
   e) Conclusions.
3) References (even if only to MPL handout) in Physical Review style.
4) Equations with more than a symbol and number appear in separate lines with equation number.
5) All symbols defined.
6) At least one appropriate block diagram.
7) Tables numbered separately in the order in which they appear in the text.
8) All figures and graphs numbered consecutively as they are cited in text.
9) Uncertainties, labels on axes, etc. on graphs. All figures have a descriptive caption.
10) Proper treatment of significant digits and number format.
11) Discussion of experimental uncertainties, both random and systematic.
12) Forceful positive statement of conclusions at end of article.