General Presentation Checklist (info specific to coding talks on the last page)

1) Determine what question(s) you want to answer with your data/talk
2) Hopefully you can ensure that your questions are testable (falsifiable)
3) "Tell the audience what you are going to say (goal/questions), say it (data), tell them what you said (summary)."
4) Include information only if it helps answer your goal/questions

Before you make your talk please ensure you acquired all data requested in your version of the lab manual.
For example, if I ask for data including both positive and negative x-values you had better do it.
Taking the real data can be critical for finding sources of error.
Do not skip data collection simply because you believe the data will be the same for both positive and negative values.

General Slide Formatting:

- It is best to use no more than 2 or 3 fonts (1 for text, 1 for equations, and 1 for code).
- Use sans-serif fonts (Calibri, Corbel, Candara, Consolas, Constantia, Cambria).
- For code use a monospace font (`Courier New`, `Lucida Sans Typewriter`).
- Keep all font sizes (including axis labels on graphs) 18 point or larger.
- EXCEPTION: When citing another's work, use 14 pnt font with the citation appearing on same slide as cited work.
- Use dark letters on a light background or light letters on a dark background.
- Limit text blocks to no more than two lines each.
- Lists in slide should typically contain no more than 3 items.
- Use animations to unveil important points on busier slides.
- Avoid excessive animations.
- Limit the text on each slide; remember that you will be filling in the details with your talking!
- Be generous with empty space (EXCEPTION: Plots often use up almost the entire slide if possible).
- If you have something on your slide you will not explain, remove it from the slide.
- Humor can be fun but also distracting; test drive any attempt at humor on peers before inclusion in your talk.
- Always be thinking: will people be able to see this at the back of the room? Keep images large…

Expectations on Equations, Figures, & Plots
You should be using this opportunity to learn the following:

1) how to use the equation editor
2) how to make your own figures
3) how to make plots

WHY? Searching the internet *might* be faster for one talk, but in the long run making your own will eventually become a vastly superior method. To that end, I have made many training vids to show you how in this playlist:
https://www.youtube.com/playlist?list=PL4Sl1ZPMcTDVt4a2PadxWx9d3EWoBZV3n

I don't want you searching the internet for figures.
Take photos of your actual device instead.
Create your own figures using the training vids or instructor help.

I don't want you pasting my figures from the workbook solutions into your slides.
I am ok with you using my figures as a guide in creating your own work, but your work should be your own

One recommended slide order is shown below. For some presentations, it might make sense to put the procedure slide ahead of the theory slide. In other cases it might make sense to make several slides that each have a mix of theory and procedure. Sometimes the theory or procedure is so big it might need more than one slide.

Title Slide

- Include overarching question/goal & your names.
- Try to include a relevant image (perhaps a related simulation image or a cool image of your apparatus)

Goal Slide

- What is/are the question(s) you plan to answer?
- What phenomena/theory do you want to compare?
- Do not exceed three goals/questions
- Having one goal often forces you to organize well and ultimately produce a better presentation

Theory Slide

- Include a simplified sketch showing your idealized experiment (link for help on MS PPT graphics).
- Specify any important assumptions (air resistance negligible, friction negligible, etc)
- Create any equations using the Equation Editor
- Use the same variables in your procedure, theory, data, graphs, and conclusions slides
- Provide the starting point equation (equation you used to relate to graphs or start your derivation)
- Provide the final result equation (equation relating graph trendline to physical parameter or final derived equation)
- Skip intermediate steps showing the algebra (but you should still know the entire derivation well)
- Remind people of how the final equation(s) relate to your goal questions
    - Tell the audience what you predict to happen
    - Tell the audience what results would verify/falsify your hypothesis?

Procedure slide

- Include before and after pictures of the apparatus
- Describe how you started and stopped the experiment
- Describe how you acquired data or mention any special equipment (with Tracker, stopwatch, photogates, etc)
- Describe any omissions in data acquisition (did you start late or start early for any reason?)
- Remind the audience of your assumptions from the theory slide and discuss the validity of those assumptions
- Instead of pictures, you may show a movie of the experiment (make a picture slide as well just in case the video fails during your talk!)
- Be extra careful when embedding video clips in presentation. Have a backup method to show the vids as well. Some possible ways to have a back-up are described below.
    - Put the clip on YouTube, have it open in a separate window while your presentation is running
    - Have the clip on a flash drive, have it open in a separate window while your presentation is running

I expect your plots to blow me away with their perfection.
Watch these training vids to get the formatting right OR incur my wrath on presentation day.
https://www.youtube.com/playlist?list=PL4Sl1ZPMcTDVt4a2PadxWx9d3EWoBZV3n

Data Slide(s)

- Remind people of how the data relates to the goals
- Avoid large data tables, no one reads them
- Use graphs to represent data
- Variable should be in italics, units are not italicized
- Check the units to see if the numbers seem realistic & consistent
    - E.g. if you write x = 32.4 m, did you mean x = length of football field?
    - Did you accidentally use cm for x and $\frac{\mathrm{m}}{\mathrm{s}}$ for v?
- Use superscripts appropriately (e.g. write $\frac{\mathrm{m}}{\mathrm{s}^2}$ not m/s^2)
- Use subscripts appropriately
    - In general, numbers in subscripts are not italicized (e.g. v_1, m_2)
    - In general, letters in subscripts are italicized (e.g. v_a, m_b)
- Format graph axes
    - Label axis with variable (in italics) and unit (not italicized)
    - Use 18 pt font or larger (both the numbers and the label!)
    - Avoid scientific notation
    - Sig figs on your axes should match the sig figs of your data
    - Use a wise choice of prefix (minimize leading or trailing zeros)
    - Major tick marks should start with a 1, 2, or 5 (e.g. 0.1, 0.2, 0.5, 10, 20, 50, 100, etc)
    - EXCEPTION: For axes representing angles, consider 10°, 15°, 30°, or 45° as tick mark increments.
- Include discussion of how you estimated of experimental error (sig fig rules, % errors, error propagation, etc)

Conclusion/Summary/Going Further Slide(s)

- Restate the goal questions
- What data answered those questions (restate important data and include error estimate)?
- What data verified or falsified your hypothesis (restate important data and include error estimate)?
- Were your predictions supported or not supported by the data (restate important data and include error estimate)?
- Was anything particularly surprising to you?
- Is there a way to modify the experiment to make it a better test the theory?
- Is there a way to modify the theory to make it a better model for the experiment?
- Is there a related experiment that would be interesting or unusual?