CADET _____ SECTION _____ TIME OF DEPARTURE _____

DEPARTMENT OF CHEMISTRY & LIFE SCIENCE

CH365 2024-2025
Thanksgiving Bonus
1 December 2024

TEXT: Smith, Van Ness, & Abbott
SCOPE: Attached LyX Handout and CDP
SUGGESTED TIME: 120 Minutes

References Permitted: Any.

**INSTRUCTIONS**

1. This is a BONUS exercise and is due **2359 1 December 2024**.
2. There is one problem on one page (not including the cover page).
3. Save all electronic work to Canvas.

(TOTAL WEIGHT: 30 POINTS)

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DO NOT WRITE IN THIS SPACE

| PROBLEM | VALUE | ADD |
|---|---|---|
| A | 30 | |
| TOTAL BONUS | 30 | |

Cadet:_____

| Problem: | Weight: |
|---|---|
| A | 30 |

A handout accompanies this project. The handout describes LyX, a document processing software package. The handout is also a sample report and contains all necessary instructions for installing LyX and using it to create a report. Your assignment is to read and follow the instructions in this handout to generate a short report using LyX.

Specifically, write a short report about capstone assignment number 2. This limts the scope of the report and should make it easier to write about. In the report, describe what you did to answer the question.

The following requirements and specifications must be included:

- Your submission must be written in LyX and submitted as a single pdf document. The pdf is produced automatically by LyX as described in the handout. No other word processing software or format will be accepted.
- You report should be two to four pages in length but can be longer as needed.
- Your report must include a title, your name, date, abstract, introduction, methods, results, conclusions, and references.
- Furthermore, your submission must include the following items: type-set equations, at least one table, and at least one figure.
- Your grade will be based on (1) the inclusion of the requirements, and (2) the quality of your writing (use of correct grammar and paragraph structure and interesting content).
- LyX is also installed on your desktop computers, which can be accessed remotely.

# My First LyX

Andrew Biaglow

November 22, 2024

**Abstract**

LaTeX (stylized as LaTeX and pronounced LAY-tek) is a typesetting language that is widely used for technical writing. LaTeX has a reputation of being hard to use because it is essentially a programming language that controls every aspect of typesetting. In LaTeX software, such as TeXworks, the typesetting commands are entered by the user, producing a file which is part content and part markup codes and code tags. LyX is a software package that puts LaTeX into a windows-like environment. LyX (stylized as LyX and pronounced licks) is different because you type the content without any of the codes and tags. This program is easy to use because the user interface is "what you see is what you mean" or WYSIWYM (pronounced WIZI-wim). In other words, you type what you mean at the keyboard and LyX takes care of making it look nice. In this short tutorial, I will demonstrate some of the essential elements for creating a LaTeX document in LyX. That is, I will show you how to enter a new section, how to enter equations, tables, figures, and then bibliography items, and then I will wrap up by showing you how to cross-reference items. Of course, a great deal of customization is possible that you can try on your own once you learn how to navigate the software.

## 1 Introduction

Hello, everybody! This is a LaTeX tutorial that I have developed to show you how to quickly generate a professional-quality document that includes front matter, sections, equations, etc. You should read through this document and type each section as you are prompted to do so.

The first thing you will want to do is download and install the software. As a prerequisite, you will need a LaTeX compiler on your computer. I use MiKTeX (stylized as MiKTeX), which installs a LaTeX compiler called TeXworks. To find MiKTeX, go to google and search for a MiKTeX download. The first link found is the download site at MiKTeX.org. Download it and install it. During the MiKTeX installation, you will be prompted to check for updates, but this is not required. It will work without the updates. After MiKTeX is installed, you will want to find and download LyX. Again, I searched for LyX downloads in google and the first link found I found was the LyX.org website. In this site, go to the Windows binaries, and download the 64-bit Windows Installer. Installing

LyX takes a while, so be patient. LyX will search for any packages it is missing on the internet, download them, and install them for you.

After downloading and installing LyX, open the software. You are now ready to create a document. The first thing you should do after opening the program is to create the document front matter, including title, author, date, and abstract. You can find Title, Author, Date, and Abstract in the environment drop-down list at the upper left corner of the LyX window, right underneath "File." After you enter and complete each of those things, you can create your first section. You will find "Section" in the same environment drop-down list. When you are ready to see what your document looks with type-setting, you can click the "View" tool or type Control-R. The "View" tool looks like a pair of eyes (  ) and is in the upper left corner of the LyX window.

## 2 Equations

Now let's try to enter an equation. First find "Insert" in the LyX main menu. Go to "Insert," then "Math," then "Numbered Formula." This will put a small blue box into your LyX document, with an equation number over near the right margin. Click on the small blue box to open up the math typing tools. Do this now to see if you can enter the equation shown below.

$$x^2 + y^2 + z^2 = 1 \tag{1}$$

Another way to enter equations is to click the large blue capital Greek sigma () that appears in the LyX Menu, about three-quarters of the way over to the right. However, if you use this tool, it will put your equation into your paragraph like this $x^2 + y^2 + z^2 = 1$, instead of as a stand-alone numbered equation as shown in equation 1 above.

So, it appears from equation (1) that adding equations is straightforward. However, this equation is also numbered in a way that allows you to cross-reference it. Let's try inserting a cross reference to equation 1. To do this, you must first create a label. Do this by right-clicking the equation, then going to "Equation Label," and then typing something like "eq1" into the label field. Then, when you want to reference this equation later, you simply go to "Insert," then "cross-reference," and then choose the desired label from the list of available labels.

## 3 Tables

Tables are just as easy to create. The table entry tool in LyX is found in the LyX main menu in "Insert." Go to "Insert," "Float," then "Table." While you can insert a table directly and without "floating" it, the float method is preferable since it automatically centers the table on the page and allows to you type a caption. Table 1 below was created using "Float."

Table 1: A simple grid table.

| | A | B | C |
|---|---|---|---|
| D | 0.101 | 0.202 | 0.303 |
| E | 0.404 | 0.505 | 0.606 |
| F | 0.707 | 0.808 | 0.909 |

A strength of LaTeX is its ability to place, or "float" items to a position on the page where they will look nice. Sometimes, however, we want more control over where the item is placed. To control the placement of the float, right-click "Float: Table" and then select "Settings..." Go to the "Placement Settings" drop-down menu, and choose custom. Then put a check mark into the box that says "Here definitely." This will place the table at the exact spot where it was entered in LyX.

# 4 Figures

Now let's try to include a figure. The method is similar to what we did in section 3 for tables. Go to "Insert," "Float," then "Figure." Enter the figure caption into the box that appears after "Figure 1:" In order to cross-reference the figure later, use "Insert" in the main menu to insert a label inside the figure caption box. Then, put the cursor above the caption and go to "Insert" in the main menu, then "Graphics." Use the "Browse" button to browse to your figure. If you want to reproduce what I did here, I used a screen shot of the LyX window (Alt-Print Screen), pasted the image into Paint, then saved it as a jpg image.

Since the figure will appear at full size in the type-set document, you need to scale it so that it fits appropriately on the page and so that it looks nice. To do this, right-click on the image in LyX, go to "Settings...," then check the box next to "Scale graphics (%)" and set this value to 50%. While 50% is a good number to use for image scaling in this tutorial, some trial and error will be normal when you start creating your own documents.

Notice that the image is also displayed in the LyX window. Since images tend to be large, this may take up a lot of space in your LyX window, and can disrupt the visual flow of the document. So I also recommend that you display the figure as an icon in LyX. This will not affect the appearance of the type-set document. To do this, right-click the image in the image float, then go to "Settings..." to open the "Graphics" window. Then go to the "LaTeX and LyX options" tab (at the top right of the Graphics window, and remove the check from the box next to "Show in LyX." Also, in this case, like in Table 1, I over-ruled the float positioning and told LyX that I want the figure to appear "in this location, if possible," as described in section 3.

Finally, the image is in its own paragraph, even though it is inside a float. Since we want the image to appear centered, we use the the paragraph settings button. It looks like a blue backwards "P" with some lines in in (  ) and is found in the upper right corner of the LyX window. You can also center the paragraph

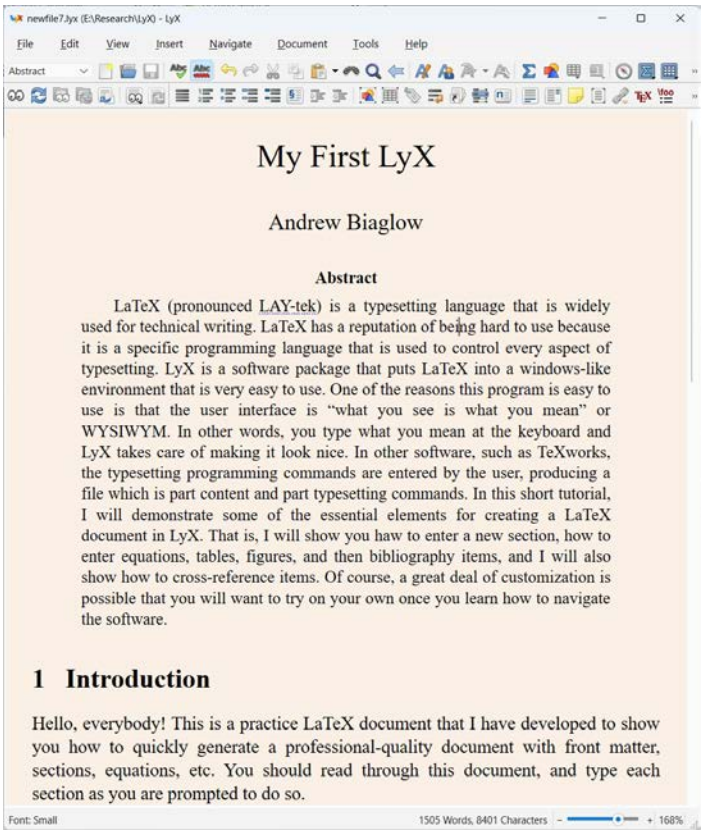


Figure 1: This is my first figure, a screenshot of the LyX window.

from the main menu (Edit→Paragraph Settings). You will see a "Center" radio button under alignment. Now the float is ready and looks the way we want it.

# 5 Adding References

Adding references is accomplished with the environment drop-down list (upper left corner of the LyX window). When you want to add citations, simply place the cursor at the end of the document, then go to the drop-down and select "Bibliography," near the end of the list at "Backmatter." This will add a references section and you can then just type in the reference. In the example below, I typed "A. Biaglow, My First Reference, 2024." Once the citation is entered and the "References" section is created, you can right-click the gray label to the left of the citation and customize its settings as desired. You can also site the reference by adding a "Citation" from the main menu under "Insert." In this case, I added a citation to reference [1].

Here are some additional references to help you get started. First, in the

Help menu, there is an excellent tutorial and I encourage you to read it. For more information on LyX, there is an excellent graphical tour on the LyX.org web page at reference [2]. Additional guides to LaTeX can be found on the internet and in references [3, 4, 5].

# References


[1] A. Biaglow, "My First Reference," 2024.

[2] "LyX Graphical Tour," https://www.lyx.org/Walkthrough, 2024.

[3] Stefan Kottwitz, "LaTeX Beginner's Guide," 2nd Edition, Packt Publishing, 2021 https://latexguide.org/contents/, 2024.

[4] Stefan Kottwitz, "LaTeX Cookbook," Packt Publishing, 2024, https://latex-cookbook.net/.

[5] Stefan Kottwitz, "LaTeX Graphics with TikZ," Packt Publishing, 2023.