

LECTURE 02: UNDERSTANDING EXCEL

- I. Basics of Excel
 - a. If you want a video to learn the basics of Excel, [this video](#) can help you get started.
 - b. Microsoft Excel is a spreadsheet program. Rather than a blank page for word processing, a new file is a bunch of blank cells.
 - i. These notes use the **2019** version of Excel. There may be minor differences between what's here and you see, depending on the version you use.
 - c. On the left are row numbers (1, 2, 3, etc); on the top are column letters (A, B, C, etc). Any cell is a combination of columns and letters, e.g. D8 or A1.
 - d. At the bottom are sheet numbers (Sheet1, Sheet2, etc). Each of these sheets is a blank spreadsheet, allowing multiple kinds of information in the same file. You can also reference in one sheet data in a different sheet.
 - i. Double-clicking the sheet tab highlights the sheet name, allowing you to change it.
 - ii. Clicking the icon on the far right (with the orange star) makes a new sheet.
- II. Clicking cells
 - a. **Clicking** a cell highlights it; you can start typing and it will replace whatever was there with what you're typing.
 - b. **Double-clicking** it creates a cursor icon, allowing you to edit what's in a cell without replacing the whole thing.
 - c. Clicking and holding a cell allows you to highlight multiple cells as you move the mouse. This is useful for copying and pasting sections of a worksheet.
 - i. You can also highlight whole rows or columns by clicking on the row number or column letter, as appropriate.
 - ii. And you can highlight the whole sheet by clicking in the square in the upper-left hand corner of the sheet (where the column and row name panels intersect).
- III. Cell Displays
 - a. The Number box in the Home tab allows you to change how a cell is displayed.

- b. The top bar gives you all the options for this Excel has. Some notable ones:
 - i. *Number*. Adds two decimal places.
 - ii. *Currency*. Adds two decimals places, a comma separator, and a dollar sign (\$). Has options for special display of negative numbers.
 - iii. *Accounting*. Adds two decimal places, a comma separator, a left-aligned dollar sign (\$), and expresses all negative numbers in a parenthesis.
 - iv. *Percentage*. Treats each value as a percent, adding two decimal places and a percent sign (%). Since percents are typically between 0 and 1, the values are multiplied by 100; 5 becomes 500.00%
 - c. The left three buttons are:
 - i. \$. Change to accounting style with a drop menu to change the currency symbol.
 - ii. %. Change to percent style.
 - iii. ,. Add comma style to your numbers and changes cell to Accounting (though it doesn't add the currency sign).
 - d. On the right is a pair of buttons to add or remove decimal places.
- IV. The Equal Sign
- a. After selecting a cell, you can press the equal sign. The cell will now display the result of an equation you input, rather than what you type. This has two big uses:
 - i. Rather than a number, you can use a particular cell by clicking it. This allows you to construct an equation and then easily change the values to see the result of the equation. For example, putting in A1 “=B1*C1” means you can put in any numbers in B1 and C1 and A1 will display the mathematical result.
 - ii. Excel has numerous equations built into it, some of which we will discuss in this class. After pressing “=”, you can keep typing a particular word and it will display the code for the equation you want. Type the appropriate values or cell references, separated with commas, and it will tell you the answer.
 - b. When you've referenced another cell and you've copied and pasted the cell (selecting it with single click), Excel will update your cell references relative to the new location.
 - i. Suppose you have “=B1*C1” in cell A1. If you copy the whole cell and paste it into A2, A2 will read “=B2*C2”. If you copy it into E5, E5 will read “=F5*G5”.

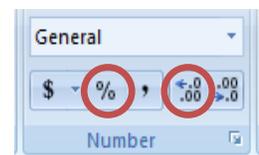
- ii. Note that if you cut—rather than copy—and paste, Excel will keep the old reference.
 - iii. If you add or delete columns and rows, Excel will update all cell references.
- c. =SUM is a useful function. It adds the value of all the cells selected. Like all functions, it has parentheses at the end; this is where the cell references go.
- i. In A1 type “=SUM(A2:A6)”. You can also type “=SUM(” and then click A2 and drag down the mouse to A6. The “A2:A6” formatting will appear automatically. You’ll see a blue box appear around those cells. Press ENTER to complete the command.
 - ii. Type numbers in cells A2 to A6; the number at the top will automatically add whatever you typed in. It will update as you change it.

V. Excel Practice

- a. Open [Data Set 0](#) on my website.
 - i. Note the descriptions tab; it’s good practice to make it easy for people to know where your data came from and what each variable means.
- b. You’ll notice one column is missing. What’s the percent of all graduates? But we can calculate that easily because we have the number of majors per 10,000. For example, for every 10,000 graduates, there are 463 graduates that majored in accounting.
- c. In D3, type “=C3/10000” and press ENTER. You should get 0.0463.
- d. Double-click the small black box in the bottom right-hand corner of D3 (so the cursor becomes a “+” sign) or drag to expand it.

	A	B	C	D
1	Group	Major	Majors per 10K	% of All
2			Graduates	Graduates
3	Business	Accounting	463	0.0463
4	Architecture and engineering	Architecture	77	
5	Biology and life sciences	Biology	206	
6	Business	Business management	814	

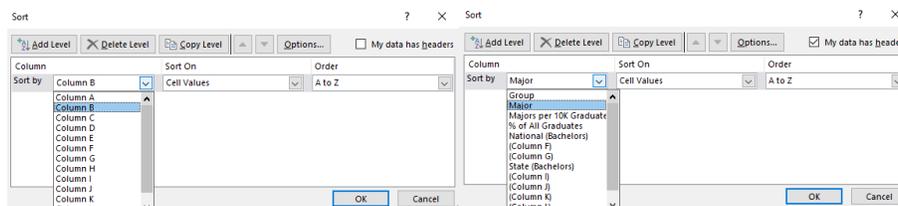
- i. Now we have the information for all 49 majors. We can highlight the column and press the % symbol at the top of the page in the Home tab under the Number group. Increase the decimal places shown, as well.



- e. Finally, type SUM(D3:D51); you should get 83.2%. Why not 100%?
- VI. Absolute Cell References
- a. Sometimes when you copy/paste, you don't want Excel to change a reference. You want the references to be absolute, not relative.
 - b. The dollar sign (\$) "locks" a cell reference by column, row, or both. Suppose in C1 you have "=A1". If you copy/paste C1 into D3, D3 will read "=B3". The copied cell when over one column and down two rows so the reference does the same. But suppose:
 - i. It started with "=\$A1". When copied/pasted to D3, D3 will read "=\$A3". It registered the move to a different row (which was relative) but didn't move to a different column (which was absolute).
 - ii. It started with "=A\$1". When copied/pasted to D3, D3 will read "=B\$1". It registered the move to a different column (which was relative) but didn't move to a different row (which was absolute).
 - iii. It started with "=\$A\$1". When copied/pasted, it'll read "=\$A\$1". You continue to reference the same cell regardless where you copy and paste it to.
 - c. As we move forward with the semester, you'll sometimes see Excel automatically add these dollar signs when you select a cell for particular functions. This is normal and won't make a difference in your analysis.
- VII. Organizing Your Spreadsheet
- a. Sometimes you'll see number signs ("###") instead of a number. No worries! It just means your column is too narrow to display the whole number. Either remove some decimal places or make your column wider. How do you adjust your column you say? Let's talk organization.
 - b. To *change your column width*, you have three options:
 - i. Go to up to where the column letter is displayed (A, B, etc.) and mouseover the line separating the columns. You'll see that the cursor turns into a vertical line with two arrows point out the sides. Click and hold to drag, making column to the **left** bigger or smaller.
 - ii. You can also double-click that spot; that will automatically make the **left** column the width it needs so everything in that column fits.
 - iii. You can also right-click a column letter and select "Column Width..." and then set the width to a certain size. This is really helpful because you can highlight multiple columns, right-click

one of the highlighted letters, and then set a width for all columns so they're the same size.

- c. To change row height, apply the rules for column left but for the numbers on the left side of the spreadsheet. Note that double-clicking and dragging will alter the height of the row just **above** your cursor.
- d. To create a column, right-click on a column letter and select “Insert.” This will create a column to the **left** of the column letter you right-clicked. All relative cell references will update.
- e. To create a row, right-click on a row number and select “Insert.” This will create a row above the row number you right-clicked. All relative cell references will update.
- f. To move a column, right-click on the column letter of the column you wish to move and select “Cut” (or press CTRL+X). Then right-click on a different letter, right-click, and select “Insert Cut Cells” and the column will be inserted to the **left** of the column letter that you right-clicked. Everything to the right will be moved to the right and all relative cell references will update.
- g. To move a row, right-click on the row number of the row you wish to move and select “Cut” (or press CTRL+X). Then right-click on a different number, right-click, and select “Insert Cut Cells” and the row will be inserted **above** the number that you right-clicked. Everything below will be moved down and all relative cell references will update.
- h. Finally, the Sort option (under the Data tab) lets you organize and reorganize the data alphabetically or numerically based on different columns. Be sure to select the whole data set, including the labels (the upper left-hand triangle will select the entire sheet) before going to Sort.
 - i. **Never** use the Sort option after select just one column. If you do, the data will be unpaired from its element and the data set will be rendered worthless.



- ii. Selecting “My data had headers” tells Excel to treat the first row in each column as the title of the column, and not as any actual data. The options under “Sort by” will update when you click this.
- iii. Note the options in parentheses on the right: e.g. (Column F). This is because the first row in Column E spans three columns.

Because other columns span two rows, such as Columns A and B, don't worry if you sort by (Column F); the second row won't get unpaired.

- iv. Also note at the top the "Add level" options. This allows you to sort by one column using one criteria, then, for all observations that are the same in the first criteria, Excel will "sub-sort" by a second criteria. So you could sort by Group, then by State median earnings (50%), and the lowest (or highest) salary for each major group will be the first row when a new group begins.

1	A	B	C	D	National (Bachelors)			State (Bachelors)			
					25%	50%	75%	25%	50%	75%	
2	Group	Major	Majors per 10K Graduates	% of All Graduates							
3	Architecture and engineering	Architecture	77		\$47,000	\$67,000	\$95,000	\$46,000	\$71,000	\$98,000	
4	Architecture and engineering	General engineering	132		\$54,000	\$81,000	\$109,000	\$54,000	\$87,000	\$122,000	
5	Architecture and engineering	Civil engineering	83		\$61,000	\$83,000	\$109,000	\$67,000	\$96,000	\$102,000	
6	Architecture and engineering	Mechanical engineering	132		\$65,000	\$87,000	\$116,000	\$70,000	\$98,000	\$124,000	
7	Architecture and engineering	Electrical engineering	168		\$66,000	\$93,000	\$123,000	\$71,000	\$103,000	\$134,000	
8	Architecture and engineering	Chemical engineering	43		\$67,000	\$96,000	\$103,000	\$56,000	\$101,000	\$126,000	
9	Art	Fine arts	148		\$33,000	\$49,000	\$74,000	\$36,000	\$51,000	\$75,000	
10	Art	Commercial art and graphics	144		\$35,000	\$51,000	\$75,000	\$38,000	\$51,000	\$75,000	
11	Biology and life sciences	Biology	206		\$39,000	\$56,000	\$84,000	\$42,000	\$62,000	\$95,000	
12	Business	Hospitality management	57		\$37,000	\$52,000	\$78,000	\$43,000	\$53,000	\$84,000	
13	Business	Human resources and management	50		\$41,000	\$58,000	\$83,000	\$53,000	\$72,000	\$106,000	
14	Business	Business management	814		\$43,000	\$62,000	\$92,000	\$48,000	\$69,000	\$100,000	
15	Business	Marketing and marketing management	315		\$43,000	\$63,000	\$97,000	\$45,000	\$65,000	\$104,000	
16	Business	General business	539		\$43,000	\$65,000	\$101,000	\$49,000	\$75,000	\$108,000	
17	Business	Accounting	463		\$47,000	\$69,000	\$103,000	\$54,000	\$78,000	\$115,000	
18	Business	Finance	233		\$49,000	\$73,000	\$109,000	\$53,000	\$74,000	\$104,000	
19	Business	Management information systems	50		\$53,000	\$77,000	\$106,000	\$66,000	\$93,000	\$116,000	
20	Communications and journalism	Communications and journalism	352		\$38,000	\$54,000	\$84,000	\$41,000	\$57,000	\$87,000	
21	Communications and journalism	Journalism	111		\$39,000	\$56,000	\$86,000	\$47,000	\$72,000	\$96,000	
22	Computers, statistics, and mathematics	Miscellaneous computers, statistics, and mathematics	56		\$41,000	\$59,000	\$85,000	\$49,000	\$71,000	\$108,000	
23	Computers, statistics, and mathematics	Computer and information science	83		\$49,000	\$69,000	\$96,000	\$57,000	\$82,000	\$109,000	
24	Computers, statistics, and mathematics	Information science	24		\$52,000	\$73,000	\$100,000	\$54,000	\$77,000	\$107,000	
25	Computers, statistics, and mathematics	Mathematics	91		\$46,000	\$73,000	\$108,000	\$48,000	\$76,000	\$112,000	
26	Computers, statistics, and mathematics	Computer science	243		\$56,000	\$83,000	\$114,000	\$65,000	\$93,000	\$126,000	

VIII. Hotkeys

- a. Hotkeys are a few keys pressed simultaneously to execute a command. This is often faster than opening a menu, searching for the right option, and clicking it. Especially since you're often typing on the keyboard as it is: switching to the mouse slows you down.
- b. Here are some common hotkeys:

<i>Type</i>	<i>Command</i>
SHIFT + ARROWS	Highlight cells
CTRL + Z	Undo
CTRL + X	Cut highlighted section
CTRL + C	Copy highlighted section
CTRL + V	Paste cut/copied section
F4 (may press multiple times)	Makes cell reference absolute
CTRL + `	Show formulas