COMPUTER RESOURCES I:
Blackboard Vista access and Excel

A modern-day cell biologist must know how to use the computer. Common tasks performed by cell biologists on a computer include obtaining the latest scientific findings from journals; writing and submitting grants and papers; collecting, analyzing, and presenting data; and accessing various databases. You will be using the computer throughout the laboratory portion of this course.

In this particular laboratory exercise, we will be covering the use of Blackboard Vista (the software that will allow you access to the course materials) and also how to use Excel to analyze and present your data. Other exercises using the computer that you will encounter in the coming weeks include using the computer to collect and analyze microscopic data, to manipulate DNA sequences, to analyze databases containing genomic information, and to write up and upload lab reports. You will be expected to use the skills you learn today throughout the semester. Please use this opportunity to ask questions about any procedures you are having difficulty with.

Part I: Course access via the Blackboard Vista system
Objective: To be comfortable with accessing the course materials for this course.

As part of your registration process for the class, you should have access to the class website located on the UMass Online Learning Management System, Blackboard Vista. All class materials, including lab experimental data, will be available online via your Blackboard Vista account. If you get stuck away from lab and need help with Blackboard Vista:
- Send email to *bostonsupport@umassonline.net*;
- Call 1-888-300-6920;
- See next page for official Blackboard Vista instructions.
- To log into the class web site, point your browser to http://boston.umassonline.net

Now, you can log in with your regular UMass Boston e-mail username and password.

Find Cell Biology 210 class in your list of classes, and click on that link. Familiarize yourself with the Blackboard Vista interface and the course web site. Here you will find the course syllabus, lecture notes in Adobe pdf format, and other resources, including all common lab data.

Before you leave the lab today, you must:
- log on to the Cell Biology course site.
- become familiar with the layout of the web site.
- be able to find, download, and open one of the lecture files.
- Covert a Word and an Excel File (from Part II of lab) into pdf format.
- Upload the PDF files to turn in the exercises from Part II. (you will required to do this routinely)

Please ask your TA for help if you cannot do these things!

Student Handout for Web-EnhancedCourses

What is WISER?

All registered UMass students have a WISER account, a self-service tool which allows students to access their academic, financial, and demographic information in PeopleSoft.

If you are a first-time student taking an open-enrollment course, your WISER account will be created when the registration process is completed. Note: It can take 2 hours before you can access your account.

Login to WISER

Access WISER at: http://wiser.umb.edu

Username: The username is in the format: UMS#######.

Password: The initial WISER password is the first two letters of your last name (capitalize the first letter only) followed by your birth date in MMDDYYYY format.

Example
Name: Dexter Morgan
Born: February 1, 1971
Password: Mo02011971

User ID:	UMS12345678
Password:	•••••••••
	Sign In

Registered students can find out their Username by going to https://www.umassadmin.net/isis/id_lookup/ and following the directions.

UMass Boston Student Email Accounts

All students are now required to use the campus email address for university communications. A UMB email account will be created for you a few business days after your WISER student account is created. Check your WISER account to locate your email Login.

UMB Webmail Website: http://webmail.umb.edu

UMB Webmail Address: FirstName.LastName00_@umb.edu (00_ is normally 001 but may be a higher number if you had a previous UMB Webmail address).

Login: FirstName.LastName00_ (the umb.edu is omitted)
Password: The initial email password is the same as your initial WISER password.

Once you've logged into email using your default password, you will be prompted to change your password. When creating your new password, you must observe the following rules:

1) Passwords must have a minimum length of eight (8) characters
2) Passwords must include at least 3 out of 4 of the following:
• Contain at least 1 upper-case character
• Contain at least 1 lower-case character
• Contain at least 1 special character (e.g. &, *, $, etc)
• Contain at least 1 numeric character
3) Passwords cannot contain all or part of your email address

Also be aware that Passwords will be locked out for 30 minutes after 5 consecutive invalid login attempts. Passwords will expire in 180 days and can never be reused.

What is Blackboard Vista?

Blackboard Vista is a web-based course management system used throughout all UMass campuses. It allows instructors to enhance your online learing experience by offering such features as discussions, reading and multi-media materials, course information (such as a syllabus), assignments, and tests.

Check Browser - Important!

Please perform a **browser check** before logging in to ensure your computer is properly configured to use Vista. This program tests that:

- Your browser is valid for using Blackboard Vista
- Cookies are enabled
- JavaScript is enabled
- Popup windows are enabled.
- The correct version of Java is installed.

Supported Browsers	Windows Versions	Mac Versions
MS Internet Explorer	6, 7	---
Firefox	2, 3	2.0
Safari	---	2, 3.0, 3.1

The most up-to-date list of supported browsers can be found at:
http://www.webct.com/tuneup/viewpage?name=tuneup_browsers_vista80_ce80

Login to Blackboard Vista

Login at: http://boston.umassonline.net

Username: Same as your email Login (no umb.edu)
Password: Same as your email password

Example
Email Login: donald.draper001
Email Password: SwordFish3!

Blackboard Login: donald.draper001
Blackboard Password: SwordFish3!

Note that the email/Blackboard password can be changed from within both the email system and the Blackboard login page by clicking the link "Password reset for Students". For additional password support, contact the IT Service Desk at ITServicedesk@umb.edu or 617-287-5220.

Technical Support

24x7 Technical Support for Blackboard Vista and Wimba Classroom
If you need technical assistance, you can:

- Send email to bostonsupport@umassonline.net
- Call 1-888-300-6920; or
- Contact support via live text chat available from the UMassOnline Blackboard Vista Login page:
  http://boston.umassonline.net

IT Support
Information regarding all technical issues including Webmail and Blackboard Vista can be found on the Information Technology home page: http://www.umb.edu/it

Part II A : Microsoft Word and Uploading Assignments

Objective: To create and electronically submit a cell biology lab assignment: create and save a word file, convert a copy to a .pdf format and upload the .pdf to SafeAssign.

The tools you learn today are required for submitting lab work and lab reports. Your work is required to be produced individually and must be submitted in .pdf format both on time and for SafeAssign evaluation.   Before continuing on to Part IIB, *using Excel*, you must first run through electronic submission of your work. To do this create a word file in which you'll answer the following quick survey, save it as a .pdf and submit it electronically. You will repeat the submission process at the end of Part IIB but there you will be converting and submitting your excel files along with the answers to the questions for Part IIB exercise 5.

1. Open Microsoft word and create a new file:
    You can create a word file either by right clicking on the desktop and choosing "new". This produces a drop down menu where you can then click on "Microsoft word document" and it will open up a new blank document in Microsoft word.   Or you can go to the start menu, click on it, find Microsoft word and click on it to open a new file.

2. Name and save your file:
    You must name your file and save it or it will disappear when you close the file. To do this go to the upper left corner of the document where it says "File" click on it, a list will be provided, find "save as" and click on it, this will open up the "save as" window. This window is where you create the three important details that allow you to relocate your file: the name, document type, and where it is located.
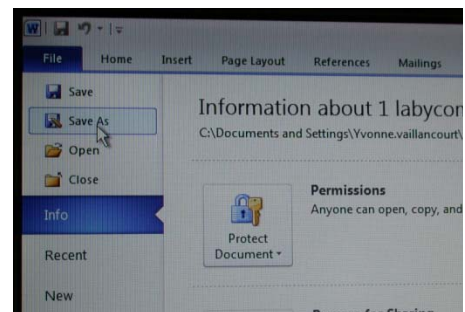
    At the upper left corner of the window it says "**Save in**". Choose the location (desktop) to save your file. You should find "desktop" by scrolling using the arrow at the right side.
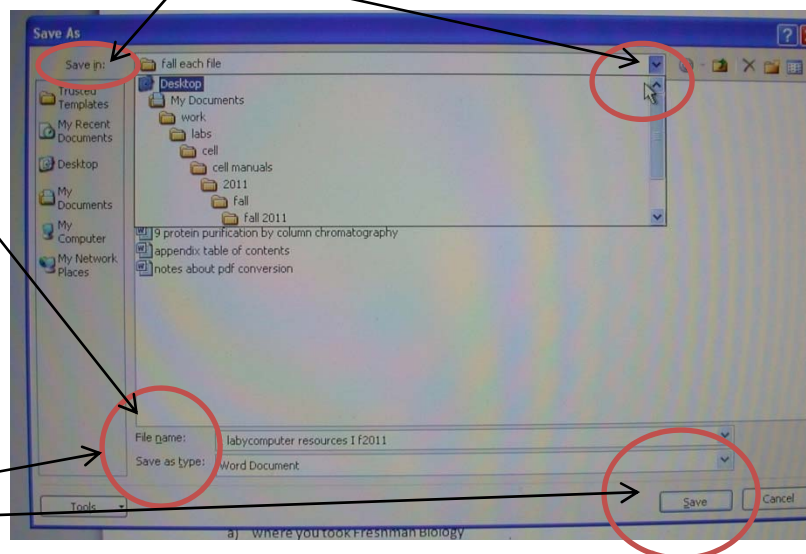

    At the bottom you can type in what you will call it where it says "**File name:** ".
    Type in your first name initial followed by your last name and labsurvey with no spaces in between. For example John Smith would name his file: JSmithlabsurvey)
   Just below that you can choose what type of file to save it as, where it says " **Save as type:** " choose Word document. Click "save".

3. **Start typing your answers to the following questions on the word file you created:**

1. your name
2. your major
3. your lab section
4. today's date
5. your TA

6. and tell us:
   a) Where you took Freshman Biology
   b) When you took Freshman Biology
   c) Who was your professor for Freshman Biology
   d) Have you taken Genetics?
   e) Have you had to wait to get into cell or genetics?
   f) If yes how long did you have to wait ?

4. **Save the file once you have finished.** You can simply click on the save icon in the upper left corner of the file.
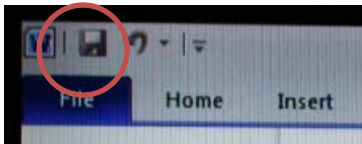

5. **Convert this document to a .pdf file in order to upload onto Blackboard.**
   To do this you can either use the "save as" function again and choose PDF under file type.
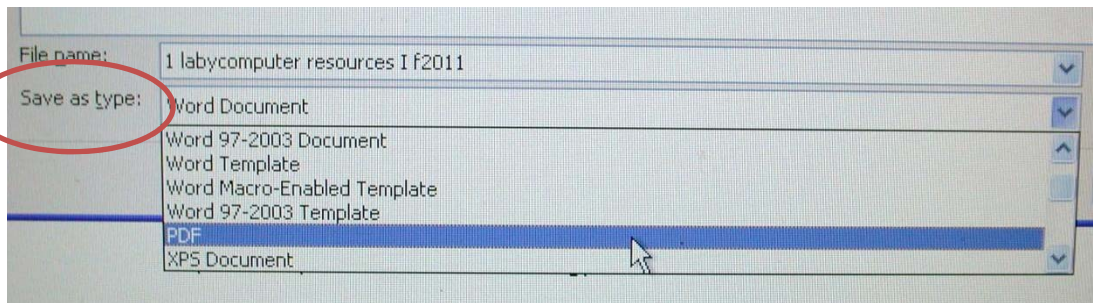
   Or you can close the file, and right click on the closed file icon/name, and a list will appear, choose **convert to .pdf by clicking on it** if it is available.

6. **Upload to the course website on Blackboard at the appropriate place.** (Your TA will show you if you don't know; be sure to record this so you can repeat it remotely and on your own.)
7. E-mail this file to yourself and your TA.
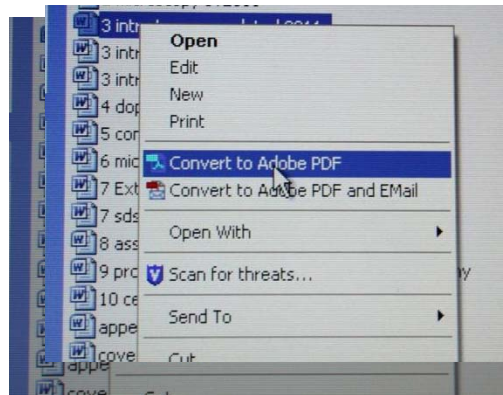
Objectives: To use Excel to analyze and present the data. To create a .pdf file within Excel and upload pdf files to Blackboard.

The skills you learn today about using Excel will be important for analyzing and presenting your data for the lab reports you will be required to write.   Before you leave the laboratory today, you will hand in your graphs and data analysis you generate from the data provided below, both as hard copies (for all parts) and as a pdf file (for exercise 5).
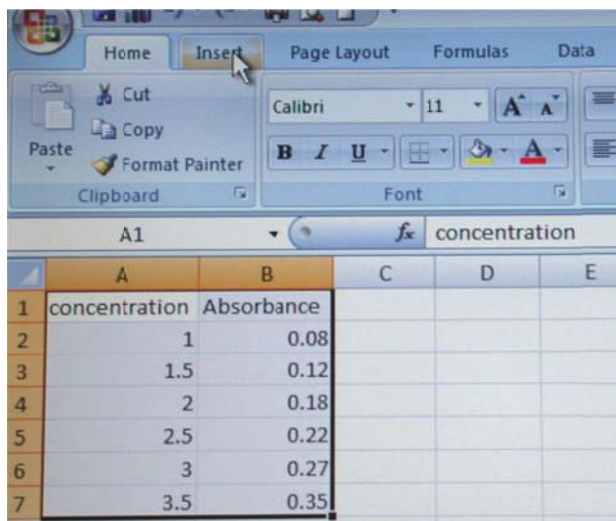
We will first go through four exercises using Excel. The first exercise involves plotting a single set of data. The second exercise involves graphing multiple variables. In the third exercise, you will be calculating an average and standard deviation and displaying these data on a graph. The fourth exercise involves creating a column chart in Excel. These exercises come with explicit instructions about how to use Excel. This laboratory session is your opportunity to ask your TAs about how to perform these exercises properly.

At the end of these four exercises, there is a data set that you will need to analyze (exercise 5). This data set does not include explicit instructions on how to analyze it using Excel, but, utilizes techniques you have already used in the four previous exercises. Before you leave today's lab, you will analyze this dataset by turning in several graphs and a short explanation of the biological significance identified by some characteristic in your graphs.

Exercise 1: Plotting a set of data and producing a curve.
Below is an Excel ^{TM} table in which column A contains the mM concentration of solution for six different samples. Column B shows the absorbance for each of the six solutions.

|	A	B	C	D	E	F
1	Concentration	Absorbance				
2	1.0	0.08				
3	1.5	0.12				
4	2	0.18				
5	2.5	0.22				
6	3	0.27				
7	3.5	0.35				

1) Enter these values into a new Excel spreadsheet.

2) Highlight the label and values in column A first, then while holding down the control key (Ctrl), also highlight the label and values in column B. Highlighting is done by holding down the left mouse button and dragging the point (cross) over the areas which you wish to highlight. After highlighting, both columns should be lightly shaded, as seen in the image to the left, except for the initial cell.

3) After the two columns are highlighted, go to the top left corner of the Excel window and click on "Insert", found to the right of the "Home" tab. Once you are in the "Insert" menu, you will have chart subtypes to choose from and you will use "scatter" which compares pairs of values. Click on the small arrow beneath the word "scatter" to get the choice of scatter plots possible.
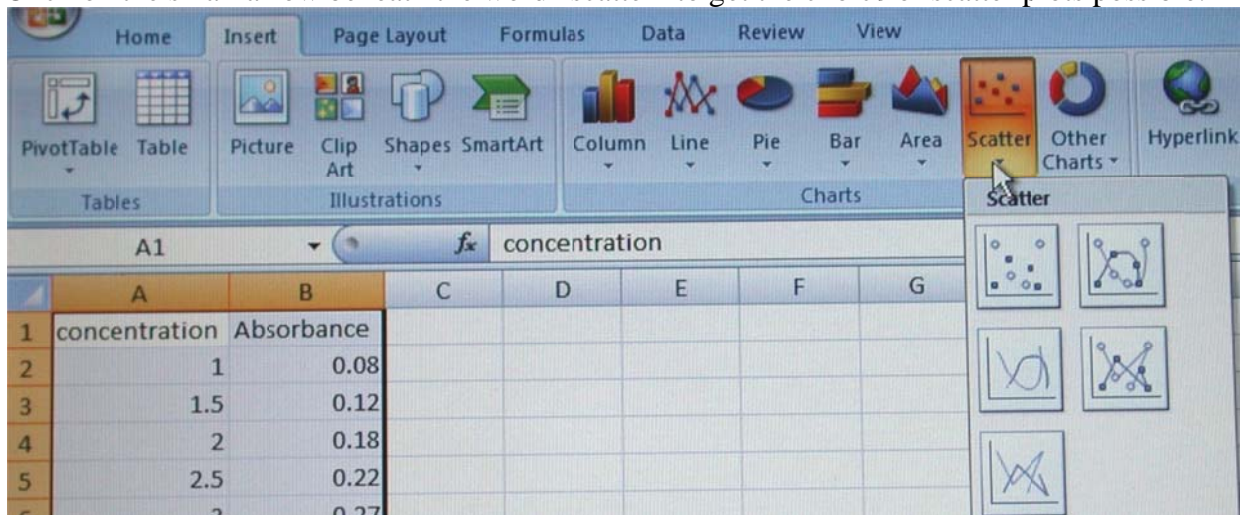
Choose the image with only markers on it, no lines just points plotted. Once you click on it, a plot of your highlighted data will show up. Notice that a new section of tabs under the heading" Chart Tools" also showed up on the menu bar. With these you can modify your chart Design, Layout and Format just click on the appropriate tab. In the image below "Layout" is the active tab.
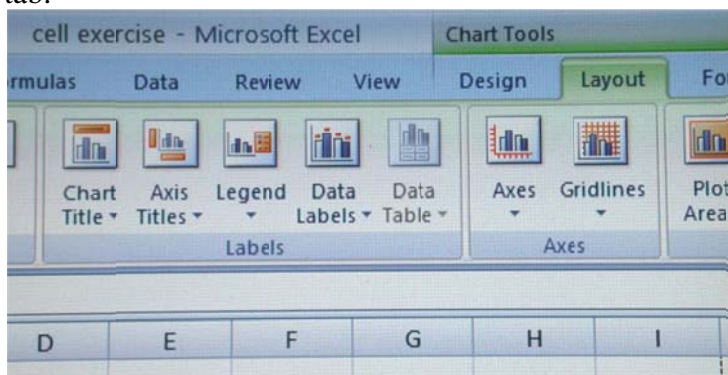
4) Now insert or format a chart title and axis by clicking on "Layout" and then clicking on "Chart Title" or "Axis Titles". You can also just click directly onto the title on your chart and alter it if needed. Give your chart a suitable name (for example "Absorbance v Concentration" and the "Value (X) Axis" should be labeled "Solution Concentrations mM" and the "Value (Y) Axis" should be labeled "Absorbance." Once this is done save the file. The chart is automatically part of the sheet, but you can save it as its own page in the workbook by right clicking on the chart and choosing "Move Chart".

5) You should now see a new box regarding chart location. Choose "As new sheet" and give the sheet a name (the chart title is usually a good one) and click on the "Ok" button. This will create the chart on a new sheet. To view the chart, click on the "Chart 1" (or whatever you named it) tab at the bottom of the Excel window. To reduce or enlarge the chart, go to the lower right corner of your window and use the zoom tool or go to "View" at the top of the Excel window and choose "Zoom". Adjust to "50%" and this will enlarge the chart enough to see detail. If you

wish to enlarge further, you may do so by going to "75%" etc.   (Also note that you are able to edit the various elements on your chart by clicking on them.)

6) Once on the chart, click directly on one of your data points so that all the data points are all highlighted, right click and choose "Add Trendline from the list or go to the top of the window and choose "Linear Trend Line" from the trendline dropdown menu (in Layout of Chart tools). You can right click on the line to format it or choose "More Trendline Options" from the dropdown menu. For example check the boxes (click in them) "Display equation on chart" and "Display R-squared value on chart" boxes. This will give you the equation and correlation coefficient for your curve. Once on the chart, click and drag them to relocate to a better spot.

7) Hand in this graph to your TA before you leave.

Exercise 2: Plotting two or more sets of data and producing multiple curves on one graph.
Below is an Excel table in which three variables were tested over time. The absorbance readings for each variable are shown in column B, C and D. Enter the following data into an Excel worksheet and then follow the steps below.

	A	B	C	D
1	Time (min)	Test 1 Abs.	Test 2 Abs.	Test 3 Abs.
2	0	0.08	0.2	0.5
3	1	0.1	0.3	0.7
4	2	0.2	0.5	0.7
5	3	0.5	0.6	0.8
6	4	0.55	0.7	0.8
7	5	0.6	0.8	0.8

1) Highlight the values only in columns A, B, C and D by holding down the left mouse button and dragging the point over area you wish to highlight. (Do not include the letters A, B, C and D!)

2) After the four columns are highlighted, go to the top of the Excel window and click on "Insert". Once in the "Insert" menu, look at the Chart options and choose "Scatter". This will bring up a window that will give you scatter options in order to create your graph, click on the picture of a graph that has data points only.

3) For this graph we want different lines to designate our different testing conditions. If you are satisfied with this type of graph then click on each series of data points and add a trendline.

4) To change the labels of your lines in the legend you can simply go to "select data" on the menu bar and click on it. You will see all data series, click on "series1" and it becomes highlighted, then click on edit. Type in "Room temp" and then click ok. You should see the name change in the legend on your chart. Now repeat for "series2" and change the name to "Boiling". Repeat for "series3" and call it "Ice".

5) Give the graph a suitable and specific name such as "Graph 2: Absorbance vs. Time for 3 Different Temperatures". To do this simply click where it says "Chart Title" on the chart and directly type in the box what you wish or type in the formula bar at the top of the window, click

enter and it will create the title on the chart. You can change the format by clicking on the layout tab of the chart tools located at the top center of the window. To insert a title or change the location of a title, click on "Chart title" in the layout tab of the chart tools. To insert the X-axis title click on "Axis Titles" found on the menu bar and choose the horizontal axis and the orientation you want. It should show up on your chart, click on it and type in the formula bar the title: "Time (min)". Press enter and it should appear on your chart. Now repeat for the Y-axis and label it "Absorbance".

6) Right click on the edge of the chart and choose "Move chart" to save it to a new sheet, choose "as a new sheet" and name it in such a way to recall which chart it is. Click on the "Ok".

7) Hand in this graph to your TA before you leave.

Exercise 3: Plotting the average and standard deviation of a series of measurements (producing one curve with error bars on a graph).
Below is an Excel table in which one variable was tested over time three separate times. The absorbance readings for experimental tube are shown in columns B, C and D. You will use excel to calculate the average and the standard deviation of the three absorbance measurements take at each time interval. Enter the following data into an Excel worksheet and then follow the steps below.

	A	B	C	D	E	F
1	Time (min)	Tube 1 Abs.	Tube 2 Abs.	Tube 3 Abs.	Average Abs.	Standard Deviations
2	0	0.08	0.06	0.05		
3	1	0.15	0.12	0.18		
4	2	0.25	0.32	0.21		
5	3	0.57	0.55	0.54		
6	4	0.73	0.76	0.69		
7	5	0.92	0.99	0.98		

1) Begin by clicking inside of the first data cell of the averages column, this should be cell E2.

2) Go to the top of the window and click on "Formulas". Look for the "fx" insert function button on the menu bar and click on it.
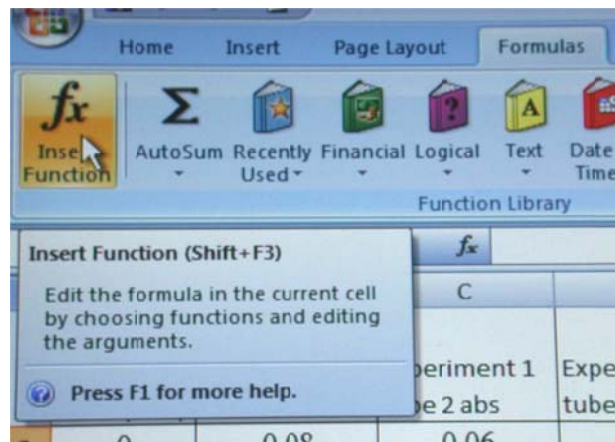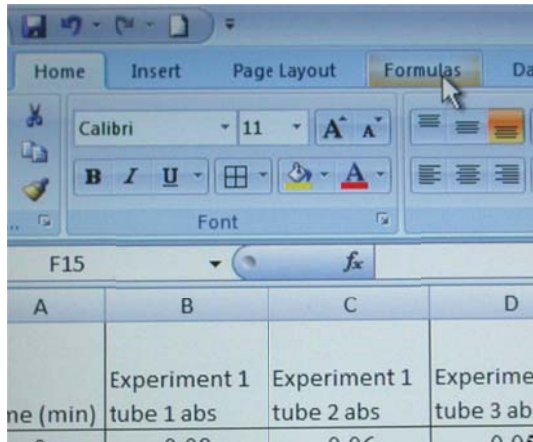
3) A window will open with both a search rectangle at the top and a box with functions listed below it. At the top of the window, where it says "search for a function" type in "average " then click "Go". A list of functions starting with "average" will show up in the larger box below where you typed in your search. Click ok again to insert the average function into the cell.
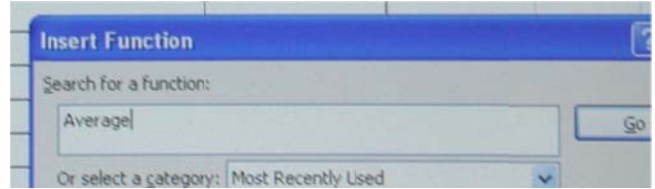

3) A new window, the "Function Arguments" window, will appear. Here you see rectangles listed as "Number 1" and "Number 2". Click inside the Number 1 rectangle and delete the default cells that were automatically generated. They are not what you want and you need to put in your own. Once all is deleted you should see the blinking cursor and now you can enter the number you wish to average. Do this by highlighting the three measurements for time zero, they should be cells B2, C2 and D2. You should see them show up in the functions arguments window in the number 1 box. (as B2:D2) To average those numbers click "ok".
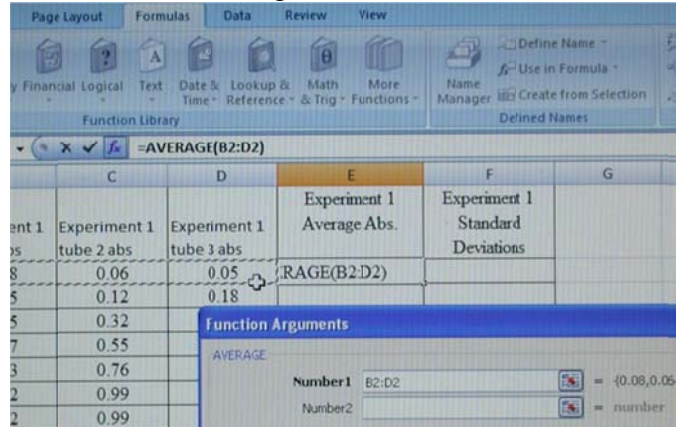
4) You should see a number show up in the first data cell of the averages column, cell E2.
You should also see the formula that created it in the function bar at the top of worksheet just above the column letters it should say "fx =AVERAGE(B2:D2)" check that it is correct.

5) You transfer the instructions to calculate the average to the rest of the cells in that column by clicking on cell E2, hold the clicker down and drag the cursor to the end of the cells of interest in that column. This should highlight the cells that need the average calculated, (E3 to E8) and though you started in cell E2, it will not be shaded it remains clear but it is active. Now press both the control key and the "D" key at the same time and it should fill each cell with the function to generate an average from the three cells to its left. You will see numbers fill each cell. If you click into each one at a time, check that the formula in the formula bar is correct.
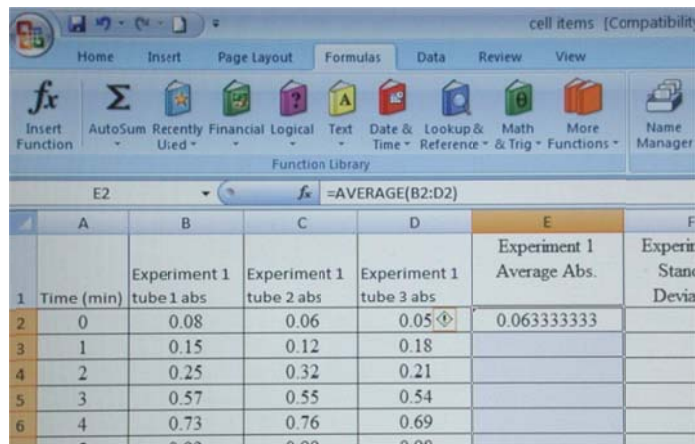

6) Repeat the same steps with modification to calculate the standard deviation of the measurements that were averaged: Start in column F and click on F2, then click on the "Formulas" heading at the top of the window. Once inside of the formula menu bar, click on "fx (Insert Function)". Type "stdev " into the search rectangle and click "go" to find and use the standard deviation version you need. Then click "ok". Again in the formula argument box number 1 delete what is automatically

generated and input the three cells that you want the standard deviation for by highlighting cells B2, C2 and D2. You should see them show up in the functions arguments window in the number 1 box. (as B2:D2) To get the standard deviation of those numbers click "ok".

7) You should see a number show up in the first data cell of the standard deviation column, cell F2. Check that the formula that created it is correct by looking at the function bar at the top of worksheet. It should say "fx =STDEV(B2:D2)" check that it is correct.

8) You will plot one line of the averaged experimental measurements. The differences across the sets of measurements will be visible with error bars on each data point using the standard deviation calculation. **To do this**, highlight the "Time" column and the "Experiment 1 Averages" column. (Highlight and hold the control key, release the clicker on the mouse then highlight the second column of interest-only those two columns!) Go to "Insert", "Scatter", and choose "Scatter with only Markers". To insert a best fit line, right click on the data points and

choose "add trend line." You should now have a line graph of Experiment 1, Average absorbance.
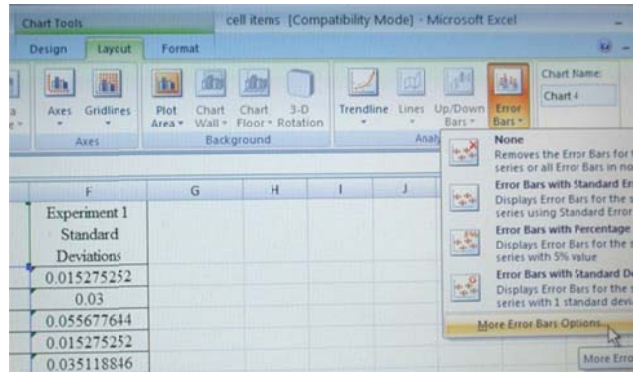
4) To insert error bars go to the "Chart Tools" section of the menu bar (middle of the top of the window) and click on "Layout". On the right side of the menu bar you will see an "Error Bars" button. Click on it, but choose "More Error Bars Options" which is at the bottom of the list. A "Format Error Bars" window opens because this automatically generated error bars, but they are not correct! You want to delete the automated ones and show the standard deviation of the absorbance measurements. **To do this**: look at the "Format Error Bars" window and notice that the lower part of the window is for formatting the error amount. Choose "Custom", and click "Specify Value" and a small "custom error bars" window opens up.
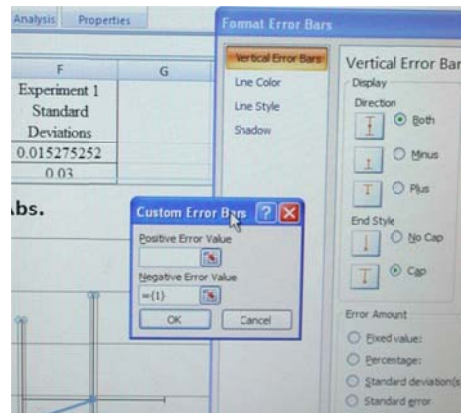
5) Notice it has the automated values entered in the positive and negative error values box and it put very large and unwanted horizontal and vertical bars on your data points. You need to replace them with bars created by the standard deviation data. Click inside the "positive error value box" and delete the contents then go to the worksheet and highlight the standard deviation column of data.

6) It should show up in the positive values box. Do the same for the negative error values, delete what was automatically put there and fill it with the standard deviation data, it is the same for the positive and negative values. Then click "ok".

7) Notice that you have new error bars on each data point. However, you only want the vertical ones. Go to the chart, click on one horizontal bar, all

will be selected and delete them. You should now only see vertical bars. They should be different in size and reflect the values of the standard deviation of each point.

8) Since you only have one line, you do not need a legend, you can click on it and delete it. You do, however, need a suitable and specific title which will indicate what is graphed. To create a title and one for each axis, find the appropriate button on the menu bar and click on it. As in the previous exercise, click where it says "Chart Title" on the chart and directly type in the box what you wish. You can change the format by clicking on the layout tab of the chart tools located at the top center of the window. To insert a title or change the location of a title, click on "Chart title" in the layout tab of the chart tools. To insert the X-axis title click on "Axis Titles" found on the menu bar and choose the horizontal axis and the orientation you want. It should show up on your chart, click on it and type in the formula bar the title: "Time (min)". Press enter and it should appear on your chart. Now repeat for the Y-axis and label it "Absorbance".

9) Right click on the edge of the chart and choose "Move chart" to save it to a new sheet, choose "as a new sheet" and name it in such a way to recall which chart it is. Click on the "Ok".

10) Hand in this graph to your TA before you leave.

Exercise 4: Creating a column chart with error bars
Now we will use Excel to create a column chart and then add the error bars for a set of measurement data (in centimeters). This data consists of several experiments, which have been repeated four times each. Enter the following data onto a new spreadsheet. You will use this data to create a column chart, with the appropriate error bars.

<>	A	B	C	D	E	F
1		Expt #1	Expt #2	Expt #3	Expt #4	Expt #5
2	Trial 1	45	51	66	24	14
3	Trial 2	42	35	61	21	8
4	Trial 3	48	34	71	22	19
5	Trial 4	40	47	52	26	6
6	Average					
7	STDEV					

1) Enter the data from the experiment into an Excel spread sheet.

2) Calculate the average for each experiment. To do this, highlight the box under the particular trial and assign a function to that box. For example, for experiment #1, you would click on box B6, go up to the top left corner and click on "Insert Function" and a new window will appear, select all for the category and scroll until you see average, then click on it and on "Ok". Another window will come up and should reveal the values you highlighted typed in the box next to "Number 1". In this particular case, you should see or enter "**B2:B5**" without the quotations (which means "all cells from B2 to B5"), and click on "OK". Now the average of these four numbers will show up in cell B6. Do this for all five experiments.

3) Calculate the standard deviation for each experiment. You will do this in a similar manner as calculating the averages, as described above, except that you will select "STDEV" as the

function instead of "AVERAGE". For example, for experiment #1, you would click on cell B7, go up to "Insert Function" and when you get a new window, choose "STDEV", which will bring up another window. You should check or type in the names of the cells you wish to determine the standard deviation for. In this particular case, you should see or type in "B2:B5" again, and click "Ok". Do NOT type in B2:B6, as this will include the average in your standard deviation, which is incorrect! The standard deviation of four numbers will now show up in cell B7. Do this for all five experiments.

4) Now, make a column chart. Highlight just the row containing the data you wish to graph. In this case, this is the "Averages" row (Row 6). DO NOT highlight the "STDEV" row (Row 7). Click on "Insert", go to the "Charts" portion of the menu bar and click on the dropdown menu under "Column". Choose the 2D column chart type. You should see a column chart appear on your sheet.

5) Click on the chart and then go to the menu bar above, click "Layout" of Chart Tools to find what you need to insert titles for each axis and a title for the column chart itself as you did with the last chart you made.

6) Once your column chart is completed you will want to add error bars to the graph. To do this, click on "Error Bars" also found in the "Layout" of Chart Tools and choose from the very bottom, "More Error Bars Options". A window titled, "Format Error Bars" will appear. You should be in "Vertical Error Bars."

7) For "Display Direction" you want to click on the button "Both", and for "End Style" you want "Cap". Next, under the header "Error amount", choose "Custom:" click on "Specify Value" and a second small window comes up called "Custom Error Bars". Now look to your data and your STDEV row (see table above and make sure you highlight JUST your STDEV row) from left to right.
When you highlight the STDEV row the "Format Data Series" window will shrink down to a single row; don't worry, that is what's supposed to happen. It will expand once you finish highlighting the whole row, including all numbers in the STDEV row. The appropriate positive error values for each of your "Averages" (again see above table) will now be filled in. Repeat this process, using the same numbers as you did for the "+" for the "-" blank space. However, first you must highlight the current contents in the "negative error value" space in order to have your data transfer into it and then highlight your STDEV row. Then click the "OK" button at the bottom of the page.

10) Your column chart should now have error bars on each column, appropriate to that column. Hand in this graph to your TA before you leave.

Exercise 5: Using the skills you've learned to graph and analyze data
The data from several experiments is provided below. These data have been collected using a spectrophotometer, an instrument you will learn how to use in this course. The spectrophotometer can be used to measure the amount of a compound by measuring the compound's ability to absorb light at a particular wavelength.

Table A provides you with the data needed to create a **standard curve**, which is simply plotted data of known concentration used to determine unknown concentrations of test samples. For this table, different concentrations of a particular compound, CMPA, were measured and the absorbance of each was recorded. **Table B** provides you with data from three experiments, where an enzyme was added to the compound at time zero. This enzyme changes compound CMPA to compound CMPB.

For this exercise:
1. Take the data in Table A and create a standard curve by plotting the concentration of CMPA on the X axis and Absorbance on the Y axis.

2. Take the data in Table B and graph all three experiments on a single graph. Calculate the best-fit line and the equation for the best-fit line for each of the three experiments.

3. Determine the theoretical absorbance for each of the above experiments at time = 3.47 minutes, using the equations of the best-fit lines.

4. Determine the theoretical amount of CMPA used at the beginning (time = 0) of each of the three experiments from the graphs you created using the data in Table B, using the equation of the best-fit lines.

Table A.

Amount of CMPA (g)	Absorbance (nm) Trial 1	Absorbance (nm) Trial 2	Absorbance (nm) Trial 3
0	0	0	0
2	0.15	0.16	0.16
4	0.32	0.38	0.35
6	0.49	0.48	0.53
8	0.68	0.61	0.66
10	0.89	0.80	0.85

Table B.

	Experiment #1	Experiment #2	Experiment #3
Time (min)	Absorbance (nm)	Absorbance (nm)	Absorbance (nm)
0	0.75	0.62	0.42
1	0.71	0.51	0.33
2	0.64	0.48	0.27
3	0.56	0.44	0.24
4	0.48	0.41	0.22
5	0.41	0.34	0.21
6	0.37	0.28	0.21
7	0.34	0.26	0.20
8	0.27	0.25	0.20
9	0.24	0.25	0.20
10	0.20	0.22	0.19

5. **Create a word file with text and graphics from your excel files as you answer the questions from Exercise 5 using your data and graphics.** Much like a lab report you

will now produce a single pdf with all facets of your work within one document and upload it to be handed in. To do this: create a new word file, put your name on the top of the page and include it in the name of your document. Type the answers to the questions and where indicated simply cut and paste a graphic in excel by right clicking on it, and you will see the option to copy. Click on it and return to your word document, right click on it and chose paste and you will have transferred your graph to the word document. It is best to be sure that your final edits to the graph have been made before you do this. Data can be selected by highlighting it in excel and copying it if you need to copy and paste tables into a word document.
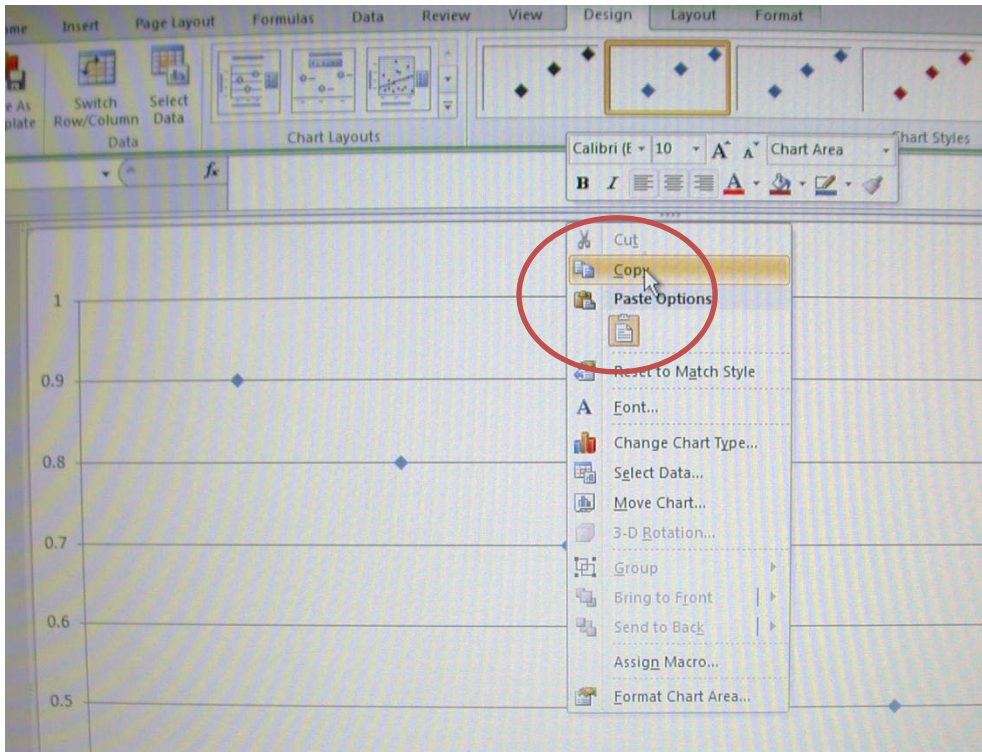
6. **Create a .pdf file of this word document that contains answers of text and graphics from exercise 5 just as you did earlier.** If you do not remember what to do refer to Part II A of this lab.

7. Show this .pdf file to your TA.

8. E-mail this file to yourself and your TA.

9. Upload your .pdf file from Exercise 5 to the course website on Blackboard at the appropriate place before you leave the computer labs.