Introduction

Statistical tests and experimental design are the foundations of the Scientific Method. Without valid experiments and valid assessment of quantitative data (numbers as opposed to ‘qualitative’ data which are not as good) no study can be scientific. Therefore, knowledge of statistical theory and practice is essential to be any kind of scientist, discovering any facts, or attempting to build theories. To put this different way, if one does not know how to design experiments and run statistics, one’s ability to do, teach, or understand science is limited. Further, without statistical analysis almost no information can be said to be reliable.

This course is introductory and assumes no previous experience with statistics, or any particular math skills. Foundational terminology and concepts will be introduced and basic inferential statistical test will be covered. This includes both parametric and non-parametric tests. This course will also focus on the importance of hypothesis building and experimental design as essential parts of scientific research.

While it is true that in the days of Mendel counting proportions was enough to lead a researcher in the right direction, today complex experimental designs, scientific measuring devices, and many types of statistical tests are available to discover new knowledge. Scientific knowledge advances only by numerical testing of data. These days there is much interest in ‘big data’, referring to the huge amount of data being produced by sensors, satellites, DNA sequencers, and other devices. Even for these giant data sets the principles of probability and basic statistics still apply. In all cases a causal relationship is best seen by relatively simple tests
of a single dependent variable in a manipulative experiment. And these sorts of experiments will be the focus of this course.

Because quantitative data are necessary for science, statistics classes are necessary. And while they are necessary, I hope this class is not boring or unduly difficult. Rather, I hope that it becomes clear that statistics are critical and informative, and not as difficult as many people think. I hope it becomes habit for people who have had this class to examine the experimental design and statistics of every paper you read. The skills the class should help you with are understanding primary literature experiments and analysis (to the point of critical thinking) and completing your own experiments (from design to analysis).

This class also includes substantial material on experimental design and hypothesis building. These components are as integral to a project as the statistics. A final point about design: poor hypotheses or experimental design can result in an entire experiment that is fatally flawed (as in all the work is ruined no publication is possible), as is shown by this quote from famous statistician Sir Ronald Fisher:

To call in the statistician after the experiment is done may be no more than asking him to perform a postmortem examination: he may be able to say what the experiment died of.

Whitlock and Schluter p. 204

Class Objectives: After this class you should be able to . . .

1. Clearly present the foundations of probability and inferential statistics.
2. Be able to write and understand null/alternative hypothesis pairs for as written for experimental design purposes.
3. Calculate and understand the meaning of descriptive statistics values, examine histograms for patterns, and identify main data distribution patterns in datasets.
4. List and understand the assumptions requirements underlying inferential statistics.
5. Describe the importance of random sampling and sample size to experiments.
6. Identify and know the definitions of statistical error types and statistical power.
7. Be able to select the correct parametric or non-parametric test for a given experimental design.
8. Understand and interpret the results of statistical tests.
9. Understand data input and test outputs from MS Excel and RealStats.
**Required Text**

Required textbook:

Suggested reading:

**Required Software**

The software used in the course will be Microsoft Office Excel, Word and an Excel add-on called RealStatistics (available at: http://www.real-statistics.com/). I encourage donations to this website as the product is free and the author answers emails and is helpful. For statistical tests the built-in functions of Excel will be used as well RealStatistics and calculators from websites I will provide. For Realstatistics there are installation instructions on the website, but let me know of any problems! Realstats works less well on Mac computers, so installation on PC’s is recommended. Realstats will not be needed for the first several weeks, so there is time to get it running correctly. For instance, the “Solver” add-in must be activated in Excel for Realstatistics to work. Make sure all these things are working before you need them. Analysis Toolpak is also useful for the course. This is an addition to Excel (an optional component of Office). Please install it if it is not already on your machine. Having both Realstats and Analysis Toolpak available is best for this course.

I highly recommend using software as soon as possible in the course. People who do calculations by hand the entire course end up spending too much time on assignments, have more mistakes in their work, and deprive themselves of learning this useful software.

**Problem Sets**

The problem sets are worth many points in this course. They will take a lot of time! There are two main aspects to the problem sets. The first aspect is to get the statistical test choice, mathematical calculations and the statistical conclusions of the problem correct. The other
aspect is to present your work in a way that clear, readable, and in scientific writing style. The following elements should be present:

1. The problem: give a quick summary of the problem including the organisms involved, the hypotheses being tested, and the response variable being examined
2. The work done, the calculations: there may be more or less work to show depending on the problem but if I cannot see where you went wrong it is difficult to give partial credit for an incorrect answer.
3. The answer: make the answer easy to find, have it highlighted or separated by line breaks so I can see quickly if the final answer is correct.
4. The interpretation of the calculations all should be arranged and presented in such as a way that a reader (me, but this is also practice for professional work) can follow the entire answer and understand it rapidly and easily.

Please see examples in the ‘Files/Example papers/Example Problem Sets’ folder for good examples. I have also notated some of the papers in there to further help you understand what I am looking for.

**Course Grading**

Grading for this course will be as follows (note Late Assignment Policy on page 15). Note that the Participation grade is based on 2 quality posts per week on Discussion Board (see page 8).

<table>
<thead>
<tr>
<th>Graded Assignments</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plagiarism Assignment</td>
<td>10</td>
</tr>
<tr>
<td>Participation (Canvas Discussion @ 10 pts per week, starts 3rd week, no points Spring Break or last 3 weeks of class)</td>
<td>100</td>
</tr>
<tr>
<td>Problem Set 1</td>
<td>100</td>
</tr>
<tr>
<td>Experiment Proposal</td>
<td>40</td>
</tr>
<tr>
<td>Final Exam Part I (Problem Set 2)</td>
<td>100</td>
</tr>
<tr>
<td>Final Exam Part 2 (Experiment Report)</td>
<td>100</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>450</strong></td>
</tr>
</tbody>
</table>

Grading Scale: The following scale will be used: A (90-100%), B+ (88-89%), B (82-87%), B- (80-81), C+ (78-79%), C (72-77%), C- (70-71), D+ (68-69%), D (62-67%), D- (60-61), F (Below 60%)
**Special Strategies for Biostatistics**

Experience has given me some ideas about where people have trouble in the course. The following is a shortlist of sticking points people have had in the previous terms of this course. They are, in no particular order, shown below:

1. **Concept misunderstandings.** It is easy to misunderstand an important concept such as equal variance between groups, how to rank data for non-parametric tests, or the fixed variable in a linear regression. As the class focuses on doing biostatistics (the problem sets and experiment) instead of talking about concepts some students think they can get by without understanding the concepts. Unfortunately, in biostatistics the concepts are important for picking the correct test, spotting errors in your own work, or realizing a number is so high or low it cannot be correct and going back to fix an error. Please do not make the mistake of thinking the concepts can be glossed over in this course.

2. **Not focusing on discussions.** Discussion posts can make the difference between understanding a chapter or not at all. Not reading posts during the week, posting only on Sunday night (which can result in a grade reduction), contributing only very short posts, and not checking grades as I post them for discussion are all issues that can occur with the discussions. The discussions are worth a lot of points in this course, it is worth it to keep on top of these. There are only a few graded assignments in the course and a lot of guidance and help can come from talking with me and others via the discussions.

3. **Not putting the time and effort into the problem sets they require.** Yes it matters where the caption for the table is and what it says, the same is true of the x-axis label on a graph. There are many things to double check: are all parts of the problem answered, does the answer seem possible given the data?

4. **Be sure to design a good experiment.** The experiment is worth a number of points. Known problems are: leaving this assignment too late in the term to start, only coping a simple classroom exercise, or having a failure of a first attempt. All these situations lead to poor experiments, poor grades, and difficulties at the end of the course.

5. **Letting the course get away from you:** this refers more generally to letting the content overwhelm you at any point during the class. Not addressing this immediately almost always means there are problems later. This material builds on itself in multiple ways. If a particular concept or chapter is not clear contact me immediately! Often a quick phone call or video chat can clear up hours of confusion and pave the way for an entirely better semester!

6. **Achievement plateau:** as in many classes the grades on the first assignment are highly correlated with the grades on all other assignments. I urge people to fight this pattern. Or at the very least try hard to have the first assignment be a high grade and then maintain this level for the entire class. It is disappointing to see an entire class, almost, where the grades on the first assignment are almost identical to the final percentage after a 15-week course. Beware of this pattern! Please try to fight this!
Special Circumstances and UNK Policies

Withdraw (W) and Incomplete (I) Grades:
Until the conclusion of the 10th week of the semester, you may withdraw from any class and receive a grade of "W." This grade does not count toward your grade point average and merely indicates that you withdrew from (or "dropped") the class. No instructor can withdraw a student from the roster; that is, if you stop coming to class the instructor cannot withdraw you from the class. The instructor will be forced to assign you a failing ("F") grade for the class. Withdrawing from a class involves filling out a simple form that the instructor and student both sign and returning this form to the registrar's office by the withdraw deadline.

Under very unusual circumstances, a grade of incomplete ("I") may be issued. An incomplete is not a substitute for a "W" (withdraw), and it is not a substitute for a poor or failing grade. An incomplete is issued if circumstances beyond the student's control prevent the student from completing the required work for the class by the end of the semester (example: student is hospitalized during final exam week). If you qualify for an incomplete grade, it is expected that you will receive this grade in all your classes. An incomplete grade will give you an extension to complete outstanding work only; it is not an opportunity to "start over" in the class. All outstanding work must be completed within one year or the "I" grade automatically converts to a failing ("F") grade. An incomplete grade will be considered only during the final six weeks of the semester, after the deadline for receiving a "W" has passed.

Students with Disabilities or Those Who are Pregnant
Students with disabilities or those who are pregnant are encouraged to contact me for a confidential discussion of their individual needs for academic accommodation. It is the policy of the University of Nebraska at Kearney to provide flexible and individualized reasonable accommodation to students with documented disabilities or those who are pregnant. To receive accommodation services for a disability, students must be registered with UNK Disabilities Services Coordinator, David Brandt, in the Academic Success Office, 163 Memorial Student Affairs Building, 308-865-8214 or by email unkdso@unk.edu. For those needing accommodation due to pregnancy, you need to visit with Student Health. The following link provides information for students and faculty regarding pregnancy rights. http://www.nwlc.org/resource/pregnant-and-parenting-students-rights-faqs-college-and-graduate-students

Reporting Student Sexual Harassment, Sexual Violence or Sexual Assault
Reporting allegations of rape, domestic violence, dating violence, sexual assault, sexual harassment, and stalking enables the University to promptly provide support to the impacted student(s), and to take appropriate action to prevent a recurrence of such sexual misconduct and protect the campus community. Confidentiality will be respected to the greatest degree possible. Any student who believes she or he may be the victim of sexual misconduct is encouraged to report to one or more of the following resources:
Local Domestic Violence, Sexual Assault Advocacy Agency 308-237-2599
Campus Police (or Security) 308-865-8911
Title IX Coordinator 308-865-8655
Retaliation against the student making the report, whether by students or University employees, will not be tolerated.

If you have questions regarding the information in this email please contact Mary Chinnock Petroski, Chief Compliance Officer (petroskimj@unk.edu or phone 8400).

Copyright Statement

The materials on this course website are only for the use of students enrolled in this course for purposes associated with this course and may not be retained or further disseminated. The materials on this course website may be protected by copyright, and any further use of this material may be in violation of federal copyright law.
Here is the schedule for the class. Readings are from Whitlock and Schluter unless noted. Problem sets and experimental design proposal assignments will be posted.

<table>
<thead>
<tr>
<th>Date</th>
<th>Week</th>
<th>Lecture</th>
<th>Readings</th>
<th>Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 8</td>
<td>1</td>
<td>Lecture 01</td>
<td>Syllabus &amp; Introduction</td>
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<td></td>
<td></td>
<td>Lecture 02</td>
<td>Chp 1 Statistics &amp; Samples</td>
<td></td>
</tr>
<tr>
<td>Jan 15</td>
<td>2</td>
<td>Lecture 03</td>
<td>Chp 2 Displaying Data</td>
<td>MLK Day, UNK Closed</td>
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<tr>
<td></td>
<td></td>
<td>Lecture 04</td>
<td>Chp 3 Describing Data</td>
<td>Plagiarism assgn due Friday (see Class Policies Section 3)</td>
</tr>
<tr>
<td>Jan 22</td>
<td>3</td>
<td>Lecture 05</td>
<td>Chp 4 Estimating with Uncertainty</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Lecture 06</td>
<td>Using Excel with Statistics</td>
<td>Chap 1, 2, and 3 from Donovan &amp; Weldon</td>
</tr>
<tr>
<td>Jan 29</td>
<td>4</td>
<td>Lecture 07</td>
<td>Chp 5 Probability</td>
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<tr>
<td></td>
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<td>Lecture 08</td>
<td>RealStatistics (or webpages for stats)</td>
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<tr>
<td>Feb 5</td>
<td>5</td>
<td>Lecture 09</td>
<td>Chp 6 Hypothesis Testing</td>
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<td>Lecture 10</td>
<td>Chp 7 Analyzing Proportions</td>
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<tr>
<td>Feb 12</td>
<td>6</td>
<td>Lecture 11</td>
<td>Chp 8 Fitting Probability models</td>
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<td>Lecture 12</td>
<td>Chp 9 Contingency analysis</td>
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<tr>
<td>Feb 19</td>
<td>7</td>
<td>Lecture 13</td>
<td>Chp 10 The Normal Distribution</td>
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<td>Lecture 14</td>
<td>Chp 11 Inference for Normal Population</td>
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<tr>
<td>Feb 26</td>
<td>8</td>
<td>Lecture 15</td>
<td>Chp 12 Comparing Two Means</td>
<td>Problem Set 1 Due Friday</td>
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<tr>
<td></td>
<td></td>
<td>Lecture 16</td>
<td>Chp 13 Handling Assumption Violations</td>
<td></td>
</tr>
<tr>
<td>Mar 5</td>
<td>9</td>
<td>Lecture 17</td>
<td>Expt Design and Stats Heath readings</td>
<td>Last day to drop March 9</td>
</tr>
<tr>
<td>Mar 12</td>
<td>10</td>
<td>Lecture 18</td>
<td>Experimental Design II Gotelli and Ellison: 6 (optional), 7, 8</td>
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<tr>
<td>Mar 19</td>
<td>11</td>
<td></td>
<td>UNK Spring Break</td>
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<tr>
<td>Mar 26</td>
<td>12</td>
<td>Lecture 19</td>
<td>Chp 14 Designing Experiments</td>
<td>Exp. prop. Due Friday</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Anderson and Engeman Readings</td>
<td></td>
</tr>
<tr>
<td>Apr 2</td>
<td>13</td>
<td>Lecture 20</td>
<td>Chp 15 Comparing means &gt; 2 groups</td>
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<tr>
<td></td>
<td></td>
<td>Lecture 21</td>
<td>Chp 16 Correlation</td>
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<tr>
<td>Date</td>
<td>Week</td>
<td>Lecture</td>
<td>Readings</td>
<td>Assignments</td>
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<tr>
<td>Apr 9</td>
<td>14</td>
<td>Lecture 22</td>
<td>Chp 17 Regression</td>
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<td></td>
<td></td>
<td>Lecture 24</td>
<td>Chp 18 Multiple Explanatory Variables</td>
<td></td>
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<tr>
<td>Apr 16</td>
<td>15</td>
<td>Lecture 25</td>
<td>Chp 21 Meta-analysis, experiment work</td>
<td></td>
</tr>
<tr>
<td>Apr 23</td>
<td>16</td>
<td></td>
<td>Class Work Week</td>
<td></td>
</tr>
<tr>
<td>Apr 30</td>
<td>16</td>
<td></td>
<td>Final Exam Week</td>
<td>Final Exam Parts I and II due May 1 by midnight</td>
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</tbody>
</table>
Orientation to Dr. Albrecht Canvas Use  
Version 2.01 Spring 2018  
UNK Biology Department

Introduction:  
The UNK Biology Distance Master’s program has many faculty participating. Part of the experience and challenge of the program is that, as in other professional situations, faculty are different from each other. Faculty have different lecture styles, different discussion board expectations, different grading priorities, and even different methods to deliver class material. I realize this might be confusing for people, but hopefully the various methods will demonstrate what works and what does not for you in your own careers. Please read this section as I try to clarify how I use Canvas in this class.

Please contact me with any questions about Canvas, the class materials or grading. Also note that the UNK e-Campus website does provide both Video Tutorials and Atomic Learning Tutorials on using Canvas, email, and MS Word see this page.

A note about Expectations:  
I approach this program with the goal of providing, as closely as possible, the level of experience I was fortunate enough to experience in my graduate career at some very good universities. This means that generally my expectations are high. By this I mean at least six hours of study time per week, a high degree of mastery of even complex material, and the persistence to do outside research and ask questions as needed. I will do my best to find, present, and interpret material I think is important and appropriate for the subject area of classes. I will also do my best to explain how the process of science works including experimental design, statistical testing, writing, and thought processes. I will also work to be as available as possible, and turn around posts, emails, and graded work as quickly as I can. For graded work this means 2 weeks or less.

It is my hope and expectation that everyone in this program is here because they enjoy biology and wish to become more knowledgeable about the subject and more proficient at teaching or researching.

Here is a quick checklist of points that may help you succeed in the course, based on my experience as a graduate student and professor:

1. **Have you prepared for class?** Have you read the material, not just once but twice? Have you looked up authors, concepts, or words you were not familiar with during the reading? Do you understand how this reading fits into the discipline in general, and why
it was assigned? On primary literature papers have you noticed the author, date, and author’s institution of the paper in addition to the data, statistical tests, and concepts in the paper?

2. Before asking an entire class what a word means have you tried to look it up? Did you try to find the word from appropriate, professional, recognized sources? Have you used the assignment itself, an index book section (if present), or another biology text you own? Wikipedia is also a good place to start, but not a good place to end.

3. Is the work you are turning in reflective of you as the professional you are working towards? Have you looked at it for mistakes? Do you have all the important concepts covered in your work? Is the organization of the paper clear and useful? Have you put in thought and work on the figures and tables to make them clear, professional, and are they referenced correctly? Has the work been proofread for grammatical, factual, spelling, and formatting errors? Do you know that the formatting correct?

**Canvas:**
The main portal for the class work in the UNK Biology Distance Master’s program is the learning management system (LMS) Canvas. Being familiar with the LMS is helpful for success in the program. Here are the components are the ones I use the most:

1. “Files”:
   a. This is where I place Powerpoint, pdf, and video files that are the lectures for classes.
   b. These files should be downloaded (not streamed) for printing out or viewing. This means a right click, not a left click on most computers.
   c. The video files are in MP4 format, this can be viewed by many video players.
   d. Some of these files are large and should be downloaded on fast internet connections.
   e. I may post other papers here as well as book sections or links to other sites, these are class materials and should be read and have notes made on them.
   f. It is fine to download all files available at any time during the semester. There are no restrictions on what devices you use or how many times you use them. Please note these files are UNK files created by me in terms of authorship.

2. “Discussions”:
   a. This section of the LMS is how you will communicate with me and each other in the class.
   b. In my classes Discussions are an important part of the class experience, there are lot of points associated with participation on Discussion Board
   c. Typically, each discussion board is opened Monday around 9:00 am Central Time, and closed Sunday night around 10:00 pm Central Time (I reserve the right to change these times).
   d. Because discussions are important, posts will be graded.
      i. I expect at least **two** substantial postings each week and **not** both on Sunday night.
ii.  *The quality of your contribution.* This is a somewhat subjective category, but the more thoughtful your comments the better the quality of discussion will be for the entire class. Your comments should be at least a few sentences. Conciseness and clarity are necessary to keep the reading load for the class to a reasonable level, i.e.: page long postings are discouraged. Your comments should be supported with information, file attachments or web sites, and should be relevant to the current topic of discussion. References are encouraged.

iii.  *How well you interact as classmates.* Your responses should demonstrate that you are aware of the discussion that has been taking place. Go beyond stating “I agree” with someone by stating your reasoning. Posts that say just “I agree” in one form or another will not be counted as posts for the week.

iv.  *Be polite and professional* be polite and constructive in your responses to other students and me.

3.  “Assignments”:
   a.  Many, if not all, the assignments in the class will appear here, so please find this area of the LMS
   b.  There are two types of assignments I use most:
      i.  Quizzes: these are timed tests, typically multiple choice questions that are available for a limited amount of time. The time frame is usually open at Friday at 5:00 pm on the week they are assigned and closing on the following Monday at 10:00 pm Central Time. These tests must be completed online within their time limit (e.g. 30 minutes) once started.
      ii.  Papers: I create assignments that are links through which you can upload documents. This system has the distinct advantage over email in that papers go directly to a ‘space’ that is specific to one person for one assignment. Users will see a paper icon in the Gradebook for the assignment when you have uploaded the document.
          1.  This function also can be set to be available for a limited amount of time. See the syllabus or assignment description (or document detailing the assignment in the assignment description) for due dates. Typically, I post the assignments at least 1 week ahead of the deadline.

4.  “Grades”:
   a.  This is the area of Canvas where grades are recorded and displayed, these are the actual grades I use, so check your grades often.
   b.  Note the symbols in the gradebook. The responsibility is yours to make sure assignments are in on time, uploaded correctly, and that the correct file is uploaded. If the wrong file is uploaded, or the file is late, penalty of at least 10% will be assessed.
      i.  Empty assignment: this means no file has been uploaded, or test taken according to Canvas. You do not want to see this if you have taken a test or uploaded a file.
ii. **Paper icon**: this means that Canvas has received a file, or that a test has been taken. A file that is uploaded may still be corrupt, or a person could still have uploaded the wrong file, but whatever it is, Canvas has it. This means I have to grade the assignment before you will see a grade. Any paper, and any test with subjective questions (such as fill-in, short answer) will have this symbol until graded.

![Paper Icon](image)

iii. **Graded assignment**: this is the grade for the assignment. It is what will be used in grade calculation.

![Graded Assignment](image)

<table>
<thead>
<tr>
<th>Plagiarism Certificate</th>
<th>Out of 10</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>10</td>
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</tbody>
</table>

iv. **Other symbols**: I think there may be a failed upload symbol that looks like a broken paper icon, but I have not seen this icon recently and I am not sure how Canvas shows failed uploads. If you see something other than the images shown above please contact me immediately.
5. “Announcements“:
   a. These are pieces of information I post that I think will help people with the class or a particular assignment as a semester progresses. Please read these when I post them.
   b. I will post class information here, such as changes to the syllabus or answering a question that is coming up repeatedly.

6. Other Features:
   a. There are other features of LMS that I use from time to time so please look around at the program.

7. Scientific Writing (last but not least!)
   a. I have included documents in Files/Scientific Writing folder to help with scientific writing. I hope to see the highest level of professional writing in assigned papers.
   b. I encourage everyone to work on improving their writing skills, as I continue to work on mine. Everyone in the program should have at least a few papers from primary journals from other classes or your own reading.
      i. If not, get a few from the UNK library collection that you have access to as a UNK student on subjects you are interested in.
      ii. Recent papers from a major journal should be read for style, voice, formatting. Such examples will show you how to build sentences, tables, figures, paragraphs, references, and abstracts. Everything you need to know is there.
   c. Also, you can always ask for feedback on sample writing before large assignments are due!
   d. Changing writing style or formatting seems easy for some students but hard for others. Not writing in scientific style or not formatting papers (or problem sets) correctly can cost a person a large number of points on assignments in a course. Please do your best with writing. This is why I have provided reference material and encourage people to read current literature articles for structure as well as content.
**Dr. Albrecht Class Policies**  
**Version 1.9 Spring 2018**

**Introduction:**
Every institution has its rules and policies and UNK and the Biology Department have them too. Because of the distance education environment, the degree of communication between student and faculty can be difficult, and misunderstandings do happen. Please keep in mind “talking” over the computer is not the same as face to face – several types of communication are lost. There is nothing quite like a conversation after class or in a hallway. Please be patient and allow more time than you might otherwise to get the solution you need. Here are my policies that will be in place for this class in addition to those of UNK and the Biology Department.

**Policies:**
1. **Paper formatting:** all work turned should have the following formatting.
   a. Size 12 font, 1” margins all around the page, page numbers present, no right justification for the text
   b. Header information on the first page: name, class, date, assignment at least.
   c. All text double-spaced with proper English spelling and grammar used. The writing should be simple, clear, scientific writing style. At the least this means: subject-verb-direct object structured sentences.
   d. Tables must be labeled at the top and have captions that explain them.
   e. Figures must be labeled at the bottom and have captions that explain them. No titles within the phase (graph) space which is the Excel default unfortunately.
   f. All work turned in should have correct references. All citations must be “(author year)” format in the text (including figures and tables if they are adapted from existing work) with a full citation at the end of the paper. Papers should be listed alphabetically by last name of first author.
      i. Citations are needed if textbook or lecture material is used (especially when quoted!). This is both the legal necessity and good practice for work beyond class.
      ii. Full citations should be in a “References” section at the end of each paper and follow these formats, reverse indented and alphabetical by author.
      iii. Each text citation should have a full citation in the Literature Cited section and each citation in the Literature Cited section must have at least one text citation.
g. **Failure of any of these policies will result in letter grade reductions.** For those of use familiar with rubrics, these are level one issues.

2. **Citation Style Examples:** further information here:
   
   http://www.scientificstyleandformat.org/Tools/SSF-Citation-Quick-Guide.html

   a. **Books:**


   b. **Computer Programs:**


   c. **Journal Articles:**


   d. **Websites:**


3. **Plagiarism and Cheating:**

   a. **Please see and complete (the underline ahead is the hyperlink, please click on it) this page - I require everyone in the class has visited this site, take the quiz and send me a completion certificate (Test & Certificate section) by the 5:00 pm Central Time on the second Friday of the semester.** Every semester, even if you have done it before (but only once per academic year is needed). Post a Word document containing a screenshot or scan into the Assignment link. The reason? So everyone knows exactly what plagiarism is. **ALL** sources in **anything** turned in for this class must be cited, including figures and anything taken from class texts (such as copying the text of problems) every time!

   i. Also, I want to make sure you can take screenshots, place images in Word documents (and resize and crop as needed), as well as upload to Canvas.

   b. Also see the **UNK Student Handbook** for UNK policy statement on plagiarism.
c. I consider plagiarism a scourge and a stain on science and detrimental to the progress of humanity. Penalties include zeros on questions, or entire tests, or failing the class outright in addition to letters in the permanent files here at UNK.

d. Citation information for APA style is given at the UNK eCampus website here.

e. A quick rule: **more than 3 words in a row from any source must be referenced**

f. Do not communicate with outside experts to answer tests. This includes non-UNK websites. Assignments are meant to assess your knowledge, not that of others, or “answers-provided” websites.

g. Work individually unless directed into groups. Your work should be your own, and any personal pronouns used in your writing (which should be few in any case) should reflect this, i.e. no ‘we’ in assignments you work on by yourself!

4. **Late work/technical difficulties:**
   a. Late work will be subject to the following grade reductions:
      i. 10% reduction of grade for any work submitted after stated deadline
      ii. A further 10% grade reduction for each 24-hour period past the stated deadline
   
   b. I understand that online classes demand attention to deadlines. However, this graduate program is not a self-paced one. This program is structured to academic terms and time frames (such as breaks) as the brick and mortar University of Nebraska system. In general people in the program show great dedication and hope this tradition continues.

   c. Technical difficulties are part of the reality of the online world. Given that truism, do NOT wait to submit assignments until the last minute or hour of a deadline. Both you and I cannot be responsible for failures of power, computers, computer networks, or even Canvas. Do not procrastinate; turn assignments in early, so there is time to resubmit if there are any problems.

   d. Important: please install and run some sort of anti-virus and anti-malware software on your computer. This is for all of us in the class, so that viruses are not spread through the class. Finally, a utilities program will help your computer run well by fixing registry files and defragmenting and optimizing hard drives:
      i. Microsoft Security Essentials (recommended and free):
      ii. other maintenance software such as System Mechanic (my favorite), Symantec System Works, Glary Utilities (free)
      iii. Malwarebytes Anti-malware (free)

5. **Online etiquette:**
   a. **Please be respectful of others in the class, even me**. It is easy to be more confrontational via electronic post than in person. I understand conversations may become heated, and irony, even sarcasm may be attempted at times be
used to make a point; however, such attempts are often not understood via posts. Please try to remain clear and kind at all times.
b. Posts I deem as offensive or inflammatory towards others or me will be removed from the discussion boards. If this becomes a continuing problem, grade reductions may result. I will keep copies of such posts.