Experimental Biology Laboratory (BIOL 300L) Syllabus
Spring 2017

Week	Dates	Days	Lab
1	1/30-2/2	M – Th	Orientation–Y*ou will lose your seat* if you do not attend! Academic Integrity/Scientific Misconduct Heart Rate Data Collection & Analysis
2	2/6-2/9	M – Th	Determination of Protein Concentration
3	2/13-2/16	M – Th	Bacteria and Antibiotic Resistance (Week 1)** Agrobacterium (Week 1)
4	2/20-2/23	M – Th	Bacteria and Antibiotic Resistance (Week 2)** Bacterial Gene Transfer (Week 1)
5	2/27-3/2	M – Th	Bacterial Gene Transfer (Week 2) Microscopy 1
6	3/6-3/9	M – Th	Bacterial Gene Transfer (Week 3) Microscopy 2
7	**3/13-3/16**	**M – Th**	**Mid-term Exam**
	3/20-3/23	M -- Th	No Lab: Spring Break
8	3/27-3/30	M – Th	Alpha Amylase**
9	4/3-4/6	M – Th	Enzymes I
10	4/10-4/13	M – Th	Enzymes II
11	4/17-4/20	M – Th	Enzymes III: Data Analysis and Interpretation Agrobacterium (Week 2)
12	4/24-4/27	M -- Th	Diversity of Stream Invertebrates (outdoors)
13	**5/1-5/4**	**M – Th**	**Practical Skills Exam**
14	**5/8-5/11**	**M – Th**	**Final Exam**

** indicates weeks where you or your lab partner will need to come back to open lab to finish experiment

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BIOL300L Extended Syllabus – Spring 2017

<u>This is a hybrid course. You will be required to prepare for lab each week</u> by reading the lab manual and completing the Blackboard Activities listed in the table below (in the order that they are given) <u>before coming to class</u>.

All due dates for the notebook checks are also listed below.

Week	Lab:	Activities on Blackboard (Bb)	Activities in Class	Notebook due in class:
0	**NONE**	1) Syllabus Quiz 2) Lab Safety Rules Quiz	NONE	
1	**Orientation; Academic Integrity; Heart Rate Lab**	1) Print and read "Truth and Consequences" PDF on Bb	• Course Announcements • Discussion of Academic Integrity • Brief Lab Exercise	Heart rate due in class
2	**Determination of Protein Concentration**	1) Bb Lecture Videos 2) Bb Quiz 3) Print data sheet and bring to class 4) Print Beer's Law Problem Set and bring to class	• Quiz (Week 1) • Lab Exercise • Bring laptop to class	
3	**Bacteria & Antibiotic Resistance 1; Agrobacterium 1**	1) Bb Lecture Videos 2) Bb Quizzes 3) Print Data Sheets and bring to class 4) Print Dilutions Problem Set and bring to class	• Quiz (Week 2) • Lab Exercises	Determination of Protein Concentration; Beer's Law Problem Set
4	**Bacteria & Antibiotic Resistance 2; Bacterial Gene Transfer 1**	1) Bb Lecture Videos 2) Bb Quiz	• Quiz (Week 3) • Lab Exercises	Dilutions Problem Set
5	**Bacterial Gene Transfer 2; Microscopy 1**	1) Bb Lecture Videos 2) Bb Quizzes 3) Print Plate Layout (2) and Data sheet<u>s</u> and bring to class	• Quiz (Week 4) • Lab Exercises	Antibiotic Resistance: Microscopy 1 due in class
6	**Bacterial Gene Transfer 3; Microscopy 2**	1) Review Bb Lecture Videos 2) Print Data Sheet and bring to class	• Quiz (Week 5) • Lab Exercises	Microscopy 2 due in class

7	**Mid-term Exam**		• Mid-term exam includes all material through Week 6	Bacterial Gene Transfer
8	**Alpha Amylase**	1) Bb Lecture Videos 2) Bb Quiz 3) Print Data Sheet and bring to class	•Quiz (week 6) •Lab Exercise	
9	**Enzymes I**	1) Bb Lecture Videos 2) Bb Quiz	•Quiz (Week 8) •Lab Exercise	Alpha Amylase
10	**Enzymes II**	1) Bb Lecture Videos 2) Bb Quiz 3) Print Enzymes II Lab Protocol and and bring to class	•Quiz (Week 9) •Lab Exercise	Enzymes I
11	**Enzymes III; Agrobacterium 2**	1) Read instructions on writing an abstract 2) Bb Quiz	•Quiz (Week 10) •Lab Exercises	Enzymes II
12	**Diversity of Stream Inverts**	1) Bb lecture videos 2) Bb quiz 3) Print datasheet and bring to class	•Quiz (Week 11) •Lab Exercise •Wear old clothes and bring water shoes or boots if you have them	Agrobacterium; Enzymes III
13	**Practical Skills Exam**	See sign-up sheet for the time of your exam.	Practical Skills Exam will cover techniques from the entire course.	Diversity of Stream Inverts
14	**Final Exam**		The Final Exam may include material from the entire course, but will focus heavily on labs after the mid-term.	

Syllabus dates, content and assignments are subject to change at the discretion of the instructor in case of weather-related cancelations or other unforeseen circumstances

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General Information

Office Hours, Dr. Smith: BS454, by appointment only

Required Materials:

- BIOL300L Lab Manual, sold in UMBC Bookstore
- Lab Notebook (bound notebook with carbon or carbonless-copy, further instructions within lab manual on Keeping an Accurate Laboratory Notebook)
- Personal computer (or use computers in UMBC Library) to watch online lectures and take quizzes on Blackboard
- Access to a printer to print out handouts
- Calculator
- Laptop with Excel or other graphing software, or access to a computer with Excel (Microsoft Office 365 is available to all UMBC students for free.)

Weekly Expectations in this hybrid course (see page 7 for further instructions):

- Read Lab Manual, including entire protocol for the lab
- Watch Lecture(s) on Blackboard
- Take Blackboard quiz
- Print out all documents and bring them to lab with you.
- Follow all lab manual and TA/instructor's instructions for completing your lab notebook
- Follow due dates given in Extended Syllabus (page 2-3).
- Prepare for quiz at the beginning of the lab that will mainly focus on last week's material.

I. Prerequisites: This course has several prerequisites. If you do not have these prerequisites, you may not take this course. No exceptions.

1. You must have a grade of C or better in Genetics, BIOL 302.
2. You must have a grade of C or better in both CHEM 102 and CHEM 102L

II. Administration

A. Attendance: Attendance is required in lab. Excused absences for acute illnesses/injuries are only given with a doctor's note (which will be validated). NOTE: Elective medical appointments are unexcused. If you are unable to attend a lab or an exam, you **MUST** contact the instructor *beforehand* so that we can discuss how to make up the material. If you do not, you will not be allowed the opportunity to make up missed work or the missed quiz/exam.

Attendance in lab is vital to learning laboratory techniques. Two unexcused absences in lab will result in reduction of your semester grade by one letter grade. Three unexcused absences in lab will result in a "F" for the course.

Excused absences in lab are only given with a doctor's note or other university-approved absence (which will be checked), and you MUST attend another section that

week to make up the missed lab and in-class quiz. You will be responsible for scheduling your attendance with the instructor at another lab section that week. Failure to attend and complete the lab the week of your excused absence will result in a zero.

Exam attendance is mandatory.

B. To contact your TA, please use email, or see the TA in the lab on the day he/she teaches. If the TA cannot help you at that time, he/she will set up a mutually agreeable meeting time and place. If your TA fails to do so, contact the instructor. Please keep all appointments, as your TA has taken time out of a busy schedule to meet you. To contact an instructor, use email (tsmith6@umbc.edu), or see one of them in person.

C. If you have a grade dispute or other concern with any aspect of the lab course, please see the instructor promptly to discuss it. Do not wait until the end of the semester. Grade disputes will not be considered more than one week after the graded assignment is returned.

D. Your TA will be in lab ~15 minutes before lab begins with the express purpose of answering your questions. So arrive early and ask!

E. Mailboxes for the instructor and TAs are found in the Biology department office on the 4th floor.

III. This is a hybrid course, so many of the materials for this class will be located on Blackboard. Please refer to the extended syllabus to see a detailed description of all of the Blackboard and In-Class Activities each week.

A. The Lab Manual (for sale in the University Bookstore) will be invaluable to you this semester. This is the only major resource for this class that will not be available to you online. You are required to read the material for each week's lab before coming to class. The Blackboard quizzes will test you on the lab manual as well as the lecture content.

B. Blackboard (Bb) Lectures will be pre-recorded and available online. The lectures will not be available until a week before that unit. Upon having reviewed the lecture content, you will be given access to the Blackboard Quiz.

> If you have any questions about the lecture material, you are encouraged to post these questions on the discussion board, so that the instructor and other students can openly discuss the material. Emails sent to the instructor about the material will not be answered until they are posted on the discussion board. The discussion board is critical to maintaining an open discussion of the ideas and topics covered in class. This is the best way to gain instructor insight or help from your peers.

C. Blackboard Quizzes will be unlocked after you have reviewed the blackboard video lecture(s) and click on "mark reviewed" for that week. The Bb quiz must be completed by noon the Monday of the "lab week", regardless of what section you are in. Computer or internet glitches are not excused, and no make ups are offered. **Do not wait until the last minute to take your quiz** in case Bb has an unscheduled

maintenance or outage. As is discussed in the Grading Criteria section of the manual, one Bb Quiz is dropped to account for technical problems, illness, or emergencies. You will be able to review each Bb Quiz including an answer key after its due date.

This quiz is important as it makes sure that you have prepared for the lab exercise before coming to class. **You will NOT be permitted to complete the lab if you have not passed the quiz with a 80% or better.** If you do not receive an 80% or better, you must retake the quiz until you do. Your grade on this assignment, however, will reflect points earned on the first attempt.

D. Protocols or other documents for each lab will be unlocked after you have completed the Bb Quiz. You are responsible for printing all of these materials and bringing them to class for full credit on assignments. This means that you must complete the Bb Quiz in a timely fashion such that you can print these documents before the beginning of class.

E. *In order to see any of the materials listed above, you must first complete a Syllabus Quiz and then the Lab Safety Rules Quiz the first week of class.*

IV. Academic Integrity in BIOL 300L

A. You may not use someone else's lab notebook, lab report, abstracts, quizzes or exams, even as a guide. This is considered plagiarism and is subject to severe penalties. Do your own work! Even if you have taken 300L before, you may not re-use any old materials and must repeat all labs.

B. Although most lab exercises are done in groups of two, you must do all calculations, make all observations, and do all written assignments (notebooks) on your own so that you learn all the necessary skills. In general, assume you should work solo unless explicitly told to work in a group. *You WILL be doing these same calculations on the quizzes and exams where you will be unable to depend on your partner!*

C. Be sure to read every word of the section on academic integrity included in this manual. If you are unclear about whether a situation is academic misconduct, or how to behave in an ethical manner with regard to an academic issue, talk to one of the instructors. The Provost requires that every instance of academic misconduct be reported to the campus's Academic Misconduct Committee, and the instructors in this lab will comply. For information regarding the procedures of this process or on the consequences of it, consult the web page:

www.umbc.edu/provost/integrity_students.html

Then click on "UMBC undergraduate student academic conduct policy". If this link does not work, go to the Provost's web page and follow the links there.

"By enrolling in this course, each student assumes the responsibilities of an active participant in UMBC's scholarly community in which everyone's academic work and behavior are held to the highest standards of honesty. Cheating, fabrication, plagiarism, and helping others to commit these acts are all forms of academic dishonesty, and they are wrong. Academic misconduct could result in disciplinary action that may include, but is not limited to,

suspension or dismissal." To read the full Student Academic Conduct Policy, consult the UMBC Student Handbook (page 7).

Grading Criteria

I. Standards for achieving letter grades are below. Note that you are not graded relative to each other, as in some courses, but against a set of standards. *If everyone in the class earns more than 90.00%, then every student will earn an A!* No grades are curved, no extra credit is offered, but please read through the policy on discussion board postings as it may affect your grade.

The standards are:
A 90.00% or higher
B 80.00% or higher
C 70.00% or higher
D 60.00% or higher
F 59.99% or lower

Grade contributions will be distributed as follows:

Blackboard Quizzes	10% of grade (lowest score dropped)
In-Class Quizzes	20% of grade (lowest score dropped)
Notebook Checks	25% of grade
Practical Skills Exam	15% of grade
Exam One	15% of grade
Exam Two	15% of grade

II. Exams

A. Exams are given in lab on the weeks given on the lab syllabus (pages 1-3).

B. Clear your work schedule now so that you can attend these exams. Last-minute absences from exams are excusable only if you 1) have contacted the instructor beforehand (or within the time that the exam is given) and 2) have a physician's note, and that excuse will be verified. Work, traffic, and simply forgetting are not acceptable excuses, and you will not be able to make up that exam. Plan ahead.

C. Practical skills Exam. Near the end of the semester, you will be given a test on the practical skills you have learned. Skills include pipetting accurately, making dilutions, using a spectrophotometer, sterile technique, using a microscope, graphing using Excel, etc. You should not need to study for this test as these should be well-practiced skills. But again, *do not depend too heavily upon your lab partner, as you will be held responsible for all skills performed in this lab. Ask questions during the semester to gain the appropriate training.* Scheduled open lab hours will be posted before the Practical skills exam to give you time to prepare for the exam and interact with the TAs/Instructor. Also, this will be a timed exam with little/no partial credit awarded, so you must be efficient and skilled in order to perform well during this exam. Practice, Practice, Practice all semester is key!!!

D. Note that because exams constitute a significant portion of your grade, you cannot afford to be unprepared. Study in advance!

E. **We try to write quiz questions that are similar to the style of questions you may be asked on an exam. However, just because you are doing well on quizzes does not mean you will do well on exams**! This is because quizzes and exams evaluate different parts of your performance. Quiz questions are meant to ensure you are keeping up with the material, and many tend to be memory-based with only 1 or 2 application or problem based question per quiz. Exam questions are meant to see if you understand the material in depth and can apply it to new situations.

F. Open lab hours will be offered each week. Times to be announced. Former students who were successful in the course will be available to help you with a skill or answer your questions. These will not be structured review sessions, so please bring questions. Students are encouraged to post questions on the Blackboard Discussion Boards throughout the semester.

III. Quizzes

A. There are two types of quizzes:
- Blackboard Quizzes (Bb Quizzes)
- In-Class Quizzes

Blackboard Quizzes:
These quizzes will be given on Blackboard and *must be completed before Monday at noon preceding your weekly section*. Once that time arrives, the quiz will no longer be available for you to take, and you will get a zero for that quiz. These quizzes are meant to make sure that you are thinking about the experiments and their importance before coming to lab. You should read the lab manual and watch the online lecture before attempting this quiz, as your first attempt determines your grade. However, this is an open-book quiz, so feel free to use your supplied resources to complete this quiz. Do not attempt to take these quizzes on a tablet or phone, as you will likely encounter problems. Only take quizzes on laptops/computers with internet connection. You MUST earn an 80% or better on the Blackboard quiz in order to complete the lab that week. If you score less than 80%, you will need to retake the quiz until you earn an 80% or better. Your grade for the assignment will be based on your first attempt, however.

Important note about Bb Quizzes: After completing the Bb Quiz, you will unlock documents that must be printed and brought to class with you. We may take off points if you fail to bring these documents to lab. It is your responsibility to come prepared with everything printed.

In-Class Quizzes:
There will be a quiz in lab during the first 15 - 20 minutes. If you are late for lab, you will have lost that time for the quiz. If you arrive after the quiz is over, your grade for that quiz will be a zero, and you will not be allowed to make it up. Be on time for lab!

B. In-Class Quizzes focus primarily on the material learned in the previous week's lab.

There will also be one or two questions of a general nature taken from the manual and/or lecture for the current lab exercise, *so you must read the lab manual and watch lecture before coming to your lab section.* Expect both mathematical and short-answer questions. Partial credit will be given on math problems if your work is neat and easy to follow. If it is sloppy, change that bad habit or don't complain about lack of partial credit.

C. For the In-class quizzes, a sample quiz is made up by the instructors. Each TA then makes up his or her own quiz, covering the same concepts in a similar way as the sample quiz. The instructors check over every TA quiz to make sure it is similar to the sample quiz, accurately worded, and fair. Thus, each lab section's quiz is different, but of equal difficulty and fairness.

D. **Your lowest Bb Quiz and In-Class Quiz scores will be dropped at the end of the semester.**

IV. Lab notebook and other supplies.

A. Purchase a lab notebook and bring it to every lab. Notebooks must be bound and provide carbon or carbonless copies of each page. The outside of your notebook should be clearly marked with your name and 300L. All data must be written directly in your lab notebook. Recording data anywhere other than your lab notebook will result in a 1-point deduction from your notebook grade for the week. You will also need to bring a calculator to every lab.

B. Put all coats and backpacks in the large drawer at your desk so that no one trips over your gear during lab.

C. Refer to the section on how to keep a lab notebook so that you do not lose points on your notebook check for leaving something out. All print-outs must be taped/stapled into your notebook in the appropriate place in order to be graded.

D. Your notebook will follow the extended syllabus schedule given at the beginning of this lab manual. It is your responsibility to complete the lab writeups in your notebook and bring it to class with you for grading. **Notebooks are due at the start of lab**. If you are late or absent (unexcused), your notebook will be penalized 1 point if it is turned in later that same day, or 2 points if turned in anytime between the following day and the next week in lab. No points may be earned for lab writeups that are over 1 week late.

VII. Discussion Board Postings

A. Since this course has pre-recorded lectures, please post all lecture, notebook, mathematic, or other questions on the discussion board throughout the semester. If you have a question, then one of your peers 1) also has that question and 2) may have the answer.

USE THE DISCUSSION BOARD!!! It will increase your performance in the course.

The purpose of encouraging you to use the Discussion Board is to increase the feeling of class participation and to clear up confusion on topics in a public forum (rather than via email to one student at a time). Also, science is driven by the

process of learning how to both ask and answer questions intelligently, so this is a fair measure of learning.

B. Potential Grade Boost via Discussion Board Postings:

In the event that your final grade is within 1.00% of a letter grade borderline, your contribution to the Blackboard Discussion Board may be evaluated. If you have posted at least three helpful contributions before the final exam, you will receive the higher letter grade. If not, then you won't. For example, if your average is an 89.10% at the end of the semester, and you have made 3 helpful posts on the discussion board, you will earn an A in the course.

Helpful contributions include posting thoughtful questions (examples: checking your logic, asking how something is done, understanding the larger picture) and answering other students' posts.

Non-helpful contributions include discussing exam content before everyone has completed the exam (Academic Honesty will be key on the Discussion Board, and prosecutable!), redundantly re-posting content on the Discussion Board (thus you are expected to be engaged in keeping up with the Discussion Board postings—the instructor and your classmates may be sharing very helpful information that you are required to know!), or posting about topics not related to this course. Also posting after the class has ended (after exam 2) is considered Non-helpful and will not be counted.

Expectations

Welcome to BIOL 300L, Experimental Biology Laboratory. This class has one simple goal**: To develop and encourage scientific habits of mind and carry out the basic skills common to biological laboratory investigation.**

That's a lot to accomplish in one semester, so you can expect to work hard and learn a lot. You are required to prepare for lab each week by reading the lab manual, watching all online lecture material, taking the Blackboard quiz, and bringing all Print-Outs, your lab manual, and lab notebook to class every week. You can expect to be in lab three hours a week. There will be additional homework assignments, and **you will need to study and prepare before each lab section.** If you feel lost, or are not achieving the level of success you desire, the amount of time *you* put in is the first place to look.

But just working hard and putting in the time is not enough. You also need to master what you have studied, and be able to apply what you have learned to new situations. There are no jobs where you write down all the things you learned in college. Jobs, especially research, require you to be able to use what you have learned, to think in new and creative ways, and to extend current knowledge into new dimensions. That's not easy to do, but the skills and patterns of thinking you will learn in this course will give you the basis you need to be successful as a practicing laboratory biologist.

Learning Objectives:

Upon successful completion of this course, students will be able to:

1. Ask questions and formulate hypotheses and predictions.

2. Develop and use models to solve scientific problems and communicate concepts.

3. Plan and carry out investigations.

4. Analyze and interpret data.

5. Use quantitative reasoning and computational thinking.

6. Construct explanations and draw conclusions.

7. Engage in argument from evidence.

8. Obtain, evaluate and communicate information.

9. Execute the following practical lab skills:

    - Accurately use serological and micropipettes to measure the volume of solutions.
    - Know which micropipettor to select to deliver a given volume.
    - Accurately use a balance to weigh out solids.

- Plan and carry out a dilution of a stock solution, both in single-step and serial formats.
- Properly focus a compound microscope. Control contrast using the condenser diaphragm. Be able to locate any specimen in the microscope. Be able to calibrate and measure the size of an object in the microscope. Use a microscope to get quantitative data.
- Properly use a spectrophotometer to measure absorbance. Understand the principles upon which this technique is based, including Beer's law.
- Conduct timed reactions (coordinating incubations, calculating rates).
- Use universal graphing software such as Excel. Generate a standard curve and use it to calculate amount of an unknown. Design and conduct an experiment demonstrating concentration dependence of a phenomenon.
- Use sterile technique.

Academic Integrity

The issue of academic integrity has been the topic of extensive discussions of late at UMBC. The Provost, the Faculty Senate and the Undergraduate Council have asked every faculty member to have each student read the below statement.

> "By enrolling in this course, each student assumes the responsibilities of an active participant in UMBC's scholarly community in which everyone's academic work and behavior are held to the highest standards of honesty. Cheating, fabrication, plagiarism, and helping others to commit these acts are all forms of academic dishonesty, and they are wrong. Academic misconduct could result in disciplinary action that may include, but is not limited to, suspension or dismissal."
>
> To read the full Student Academic Conduct Policy, consult the UMBC Student Handbook, or the UMBC Policies section of the UMBC Directory.

Examples of academic misconduct that are not tolerated at UMBC are:

> * Cheating: knowingly using or attempting to use unauthorized material, information, or study aids in any academic exercise.
>
> * Fabrication: intentional and unauthorized falsification or invention of any information or citation in an academic exercise.
>
> * Facilitating academic dishonesty: intentionally or knowingly helping or attempting to help another commit an act of academic dishonesty.
>
> * Plagiarism: knowingly representing the words or ideas of another as one's own in any academic exercise, including works of art and computer-generated information/images.

So, how do these principles and definitions apply to your work in this and other biology labs?

Obviously, some behaviors are so patently dishonest that everyone knows they are. For example, you may not look at someone else's exam paper or answer sheet during a test, nor may you copy from either. You must keep your answer sheet covered so as to not facilitate cheating, either intentionally or unintentionally, by someone else.

Some students justify their acts of academic dishonesty by saying that the rules and definitions are not clear. Hence, let me provide some concrete examples and explanations.

I. Use of materials from a previous year's class:

The course information lists a specific requirement regarding academic conduct described below.

> **Use of exams, data, quizzes, lab notebooks or formal lab reports from previous years' classes, even as a guide, is strictly prohibited. This is considered plagiarism and is subject to severe penalties!**

We know that some students possess materials written by other students in past years, specifically old lab reports and abstracts. You may not copy from such written materials, or even use them as a general guide. We consider this plagiarism. Plagiarism is defined as "knowingly representing the words or ideas of another as one's own in any academic exercise...." Writing about science is a critical skill that all scientists must master, and you cannot learn to do so by copying the work of others. Note that we can often spot plagiarized written work, even if we cannot prove it. For example, when a lab report closely follows the grading key, or an abstract uses words and phrases that we have in the past recommended during editing, we suspect plagiarism. This affects our opinion of you, especially when you ask us for a professional recommendation.

We know that some students who have inherited files of old exams, quizzes, data sheets, lab reports and abstracts lend, donate, or even sell them to others. This is facilitating academic dishonesty, defined as "intentionally or knowingly helping or attempting to help another commit an act of academic dishonesty".

II. How to deal with unexpected results.

On occasion, the results you obtain from an experiment may not be the expected results. We expect you to report the results you get, no matter what. There is no penalty involved; you are not graded on achieving expected results. You are, however, expected to understand and explain the expected outcome from all experiments. If you make up results so they resemble the expected results, that is fabrication, "intentional and unauthorized falsification or invention of any information or citation in an academic exercise". If you get no results at all, you may borrow results from someone else **with the instructor's permission and if you cite from whom you obtained the data**. If you get unexpected results, feel free to consult with the instructor on how to interpret them.

III. Working with a lab partner.

Although you (usually) work in pairs, you must do your own calculations, graphs and writing. We want you to learn how to make decisions about how to portray the data; that's an important skill, and that's why you should do it alone. Once finished, it's OK for a friend to critique your work, and for you to make changes as necessary, but it's never OK to just copy. Also, you will be expected to complete these same tasks on your own during an exam or a skill test, so you should make sure that both you and your partner are able to independently complete each task.

You may not agree with everything written here about academic integrity. Feel free to consult with one of the course instructors. But these are the policies in my courses, we believe we have now made them sufficiently clear, and we expect you to abide by them. We truly believe that an academically dishonest student hurts himself or herself in the long run, because he or she will not have mastered the necessary skills for success. In addition, participation in instances of academic dishonesty affects your own self-image and damages your sense of worth. For your own sake, abide by the rules we have established in this course.

Every semester, issues of academic integrity arise. Such issues are by far the most disappointing, distasteful and difficult aspects of my job.

1. **If we find you have cheated, plagiarized, fabricated, or aided others to do so, we will impose a significant penalty of *at least* one semester letter grade for the**

first offense. This will be true even if you consider the offense minor. A second instance will result in a grade of F for this course.

2. **Every instance of academic misconduct <u>will</u> be reported to the University Academic Conduct Committee.** No exceptions, even if you consider the offense minor. Students who have been reported for academic misconduct in more than one course will be subject to severe penalties that may include notation on the transcript, suspension or expulsion.

3. By enrolling in BIOL 300L, you acknowledge that you are aware of the rules on academic misconduct. You are responsible for the content in this lab manual, and you are responsible for knowing what academic misconduct is. We will not listen to excuses like, "I didn't know this was plagiarism" or "I didn't think this is that big a deal". And it *is* a big deal, whether you think so or not. Your character defines who you are as a person and will influence the rest of your life. Think carefully about committing any act of academic misconduct. Even if you are not caught, can you live with yourself? The true test of character is what you do when no one is watching.

Keeping An Accurate Laboratory Notebook

I. Rationale

All scientists keep a lab notebook, without exception. Therefore, you will get into the habit of using one in this course. The advantage of a lab notebook is that, if kept properly, it will be a complete record of everything you do. It is then an invaluable reference when it comes time to write a paper or lab report, design a graph, chart or table, duplicate an experiment, or provide details to a colleague, supervisor or referee. Although a lab notebook can assume many formats, you will be required to include certain information in it in this course.

Your notebook will be graded, so you will be expected to follow the guidelines below. You are responsible for remembering to turn in your lab notebook at the correct time. This may seem like a waste of time to some of you. However, it is never too late to learn and practice the proper ways to document scientific work. You will need to do this if you are a lab technician, graduate student, physician, etc.

II. Logistics

A. Lab notebooks must be bound and produce carbon-copies of each notebook page. No looseleaf, composition, or other types of notebooks are allowed. You may not keep a "virtual" notebook.

B. The lab notebook is a working record, not a finished product! Therefore, everything you do goes in your notebook. This is especially true for all observations made and data collected.

Never write down data on "scrap paper" (sticky notes or torn paper); write it in the notebook! Recording data anywhere other than your lab notebook will result in a 1-point deduction from your notebook grade. No exceptions and no excuses. In private industry, you may be fired for violating this rule! This means your notebook won't be neat. So be it. But you can help the situation by being organized if not neat, leaving plenty of space so you can later make notations, write comments, etc. The lab notebook should be sitting open on your desk at all times, enabling you to make additions as necessary.

C. Errors are common in lab notebooks. That's fine, as they are only working, not final, records. But never erase or white-out mistakes. Cross them out, and then put in the proper words or numbers. This means your notebook will look messy. So be it.

D. **Use pen, not pencil.** Erasures would compromise the permanent, dated nature of a lab notebook.

E. Notebooks must be complete and up-to-date. You must finish writing up your experiment before you leave lab (unless the lab period is over), including the interpretations of the data.

F. You will submit the copy of each notebook page to your TA. This copy will be graded. The original page should remain in your lab notebook. If you generate data or graphs on a computer, print two copies, and glue one copy to the original page and the second copy to the carbon page that you submit to your TA.

III. Format for every Laboratory exercise:

A. Title: Include a descriptive title atop a new page. *Note: The title in the lab manual is not descriptive!*

B. Include the date. If you discover something important, it establishes your line of precedent as intellectual property and for legal purposes.

C. Purpose: Write down the purpose(s) of the experiment. An outline format is best. Be specific and clear.

D. Methods: In a research lab when you are doing novel research, it's important to write down everything you do, down to the smallest detail. But when procedures have already been published, you can just state that you followed the procedure as in Smith et al. 2016, for example. For purposes of this lab course, since the procedures are already published in your lab manual, just write down "as per BIOL300L manual with the following changes". It is not necessary to rewrite the procedure, but if we/you make changes, they **must** be listed!

E. Data: Record data as you get them, always! Leave space so you can portray your data in an easier-to-read format like a graph. All datasheets and Excel graph print-outs must be either taped or stapled into your notebook so that they may be graded. Also, include all calculations that you used in the analysis of your data.

F. Conclusions: Use an outline (bullet point) format to list all conclusions that can be drawn from the data. Be complete! Check the purposes of the experiment to see if you have addressed each of them. Be concise and clear.

G. Other information: Sometimes, scientists record their thoughts and observations about their experiment: its design flaws, how it might be done better, what the next logical step is, etc. This is not necessary but may be useful to you.

H. What does ***not belong in the notebook:***

a. background information
b. results of a literature search
c. detailed discussion

IV. Lab lecture notes

It is best to keep lab lecture notes in a separate notebook from the lab notebook. If you insist on having your lecture notes in your lab notebook, keep the lab lecture notes in a separate part of the notebook from the data, conclusions, etc.

V. Archiving

Your lab notebook may be useful when you ask a faculty member for a letter of recommendation. It is a record that can provide insight into how well organized you are, how complete and accurate your work is, etc. Be sure to keep your lab notebook.