

LIFE – AN INTRODUCTION TO MODERN BIOLOGY LAB MANUAL

BIOL 109

Summer 2014

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LIFE - An Introduction to Modern Biology

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Session	Date	Mon/Wed Lecture – BS004	Tue/Thr Experiment – BS165
1	May 27	None, class starts Tuesday →	Human Variation, all shapes and sizes
2	May 28 / May 29	Cell Theory and Structure	Cells and Microscopes
3	June 2/3	Inheritance	Blood Types – It's all relative
4	June 4/5	DNA Structure	Strawberry DNA Spooling
5	June 9/10	Chromosome Structure	Chromosome Karyotyping
6	June 11/12	Mutations	Spontaneous Antibiotic Resistance and DNA Damage by Sunlight
7	June 16/17	Mmmm, life.	Lab Meeting & Mini-lecture Mutations - Data Collection Abiogenesis or Cell Theory? - Lab
8	June 18/19	Midterm Exam	Abiogenesis or Cell Theory? - Data Collection
9	June 23/24	Food – Super Corn?	GMO Lab through PCR
10	June 25/26	DNA Forensics	GMO Lab – Gel Electrophoresis
11	June 30 / July 1	Open Topics Lecture (BS004)	Open Topics Lecture (BS461*)
12	July 2/3	Open Topics Lecture (BS004)	Final Exam: 1:00 – 2:00 BS165

Exams: Midterm: June 18th in class – BS004
Final: July 3rd in lab – BS165

No alpha-numeric calculators are permitted at the exam. You may not use PDAs, electronic organizers, super computers, friends and family, or cell phones as your calculator during the exam.

Biol 109 – LIFE – An Introduction to Modern Biology

I. General Information

- a. Attendance in the lab and lecture are **mandatory** and will count as part of your grade.
- b. Please observe all safety rules (page 11).
- c. Please see to it that all lab materials are disposed of or re-cycled immediately after completion of the days experiment.
- d. Please be a conservationist in this lab. Lab supplies are expensive, please use them efficiently.
- e. Please treat the microscopes especially carefully. They are quite expensive and delicate. Use a microscope gently, and leave it cleaner than you found it.
- f. Label all of your materials. Always include your entire last name, not just your initials, and the section number or day.

II. Academic Conduct

- a. Cheating will not be tolerated. From the Provost: “Anyone caught cheating or aiding another in cheating will have their exam confiscated immediately and will be given a score of ‘zero’. In addition, further action will be pursued through UMBC’s Academic Conduct Committee and/or the Office of the Provost as described in the Policy for Academic Misconduct in Undergraduate courses.”

III. Lab reports

- a. All lab reports must be completed in ink or typed
- b. Lab reports are **due at the beginning of class** on the date specified. Reports turned in during or after class are considered one day late. There is a -10% penalty per day for late reports. Reports in pencil will be counted as one day late, and penalize -10%. Reports will not be accepted after seven (7) days.
- c. You are encouraged to work together to learn the material, but lab reports must be prepared independently. Duplicate lab reports are considered cheating, and plagiarism will not be tolerated!

IV. Quizzes

- a. Quizzes will commonly be given at the beginning of lab, don’t be late. Occasionally, quizzes will take the form of an assignment to write a question prior to lab. These must be typed, or they will not be accepted.
- b. **Because interruptions are rude and unfair to other students, the door will be closed during quizzes. If you are late and a quiz is in progress you will not be allowed into the room to take the quiz.** If you have a valid excuse, you will be allowed to make up the quiz in another section. If you miss the quiz altogether, a grade of zero will be administered.

V. Notebook

- a. A **separate** lab notebook dedicated to this lab is required for each student. This must be a **bound** notebook, not a loose-leaf binder. If the pages aren't already numbered, number them before coming to the first lab. Page 1 **MUST** be a Table of Contents. Your name and section must be visible on the **OUTSIDE** of the notebook. This notebook will serve you well if you keep it properly. Lead-off lecture notes should not be included in the lab notebook. The following information for each experiment is required. It should be legible and organized enough so that years later you can understand exactly what you've done and why. These will be checked periodically. **Never come to the lab without your notebook.** Loose sheets of paper (including paper in a binder) will NOT be allowed in the lab.

Notebooks should be filled in using PEN.

Some guidelines for the lab notebook, for each experiment include

Rationale:

AKA Objective. A short explanation of purpose of the experiment. This should be written initially **before** you come to the lab. It will be refined later.

Protocol:

AKA Procedure. **Before the lab** draw a flow chart of the day's experiment(s). Base your flowcharts on the protocols listed in the Manual. As you do the experiment, check off the steps you've performed (appending times, volumes, or other pertinent information). In almost every experiment, you will be modifying the protocol slightly. Write in the modifications next to the flowchart, whether they are by direction or by accident. Flow charts are included for the Streptomycin Resistance and Newcombe Experiments for use as models.

Data:

Here you record the results. Include drawings or photocopies if describing a gel and record colony numbers, phenotypes, numbers of flies, etc. Draw graphs if appropriate. Also note which results differ from what you expect. Record ALL observations. The data is to be recorded as you collect it. Most data fit nicely into tables. Set up the tables before you collect the data. **Don't** record your data on scrap paper and then transcribe it to the notebook. Set up any calculations you need next to the data.

Conclusions:

Write a brief summary of the conclusions drawn. Compare experimental results to controls.

Some experiments are long-term. Try to keep enough space set aside for the data, so that all the data are together. An alternative is to cross-reference data and experiment by page numbers.

The notebook is worth 10% of the grade. It will be checked periodically and collected when you take the final exam. You will be able to retrieve it after the grades are compiled, usually before the end of Final Exam week.

VI. Grading

- a. Grades will be determined from:
 - i. Lab Reports – 20%
 - ii. Quizzes – 20%
 - iii. Midterm – 20%
 - iv. Final – 20%
 - v. Notebook – 10%
 - vi. Attendance – 10%
- b. Attendance is vital, it is nearly impossible to receive a satisfactory grade if more than one lab is missed or if more than one lab report is not turned in.

- VII. There is a Web Page for this course. The public page is at <http://blackboard.umbc.edu/> (case counts). Directions to enroll can be found at <http://www.umbc.edu/oit/NewMedia/blackboard/enteringbb.htm>. For more help sheets, see <http://www.umbc.edu/oit/NewMedia/blackboard/>. From there you will be able to access the guts of the web page only if you have a login ID and password. Your login ID and password are will be the same as your UMBC login and password.

A variety of information will be available inside the web page, including: A course calendar, lecture notes, quizzes, exams from the previous semester, a course discussion board, links to interesting sites, space for student content, and space for a personal web page. You are encouraged to construct a personal web page for your own edification.

The bulletin board is for posting questions and answers about the lab material and protocols. (Personal questions about grades, absences, etc... should be sent via email.)

VIII. Contacting me or your TA:

Any time during the wet lab is a good time to talk to us. Immediately after lead-off is a fine time too. The TAs will hold office hours. I am in my office or in the lab often. Just stop by.

When you send email to us, here are some ground rules:

- (1) Recognize that inboxes can get crowded, so allow some time for our reply.
- (2) To avoid being bounced by our spam filters, always include an informative subject line.
- (3) You must read email to your UMBC email address. Blackboard automatically sends to this address and I can't keep track of multiple addresses for students. If you have a different preferred email address, set things up so your UMBC email is forwarded to it. There is a link to do this on myUMBC under the 'Personal' tab, 'Create an email forwarding address'.
- (4) I prefer you send us email out of your regular mail account rather than out of the Bb email utility, because Bb email does not show to whom a message was /cc'ed. If you do send email out of Bb, include the /cc information at the top of

your message. Often emails sent from other providers wind up in my Spam folder, even if it is legitimate. This means a delay in getting your answer.

- (5) Always include your name in your text, even if you think it should be obvious to us from your email address.
- (6) If your question involves the syllabus or lab instructions or lead-off notes, paste the relevant text into your email message along with your question; this will help us to answer you more quickly and more accurately.
- (7) As with any other course activity, we expect you to be professional and that your writing be at the university level, so communicate to us in full sentences with proper capitalization and punctuation (and do not be surprised if we occasionally offer corrections should we find errors in spelling or grammar in your messages).
- (8) If you send us a message and don't receive an answer within a couple of days, check out whether your mailbox was full; that is one of the most common email communication problems we encounter.
- (9) And also check your copy of the message: if a message to us ignores too many of the above recommendations, we might return it with instructions to consult the syllabus about how to send email. In cases that are particularly egregious we might simply not reply.

IX. Academic integrity:

The following paragraph and definitions are from the UMBC Faculty Senate (2/13/01):

“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, the Faculty Handbook, or the UMBC Policies section of the UMBC Directory.”

If you’re observant, you’ve noticed that this was the first paragraph in this syllabus. You may or may not have noticed that there was no citation given there. That was my first act of plagiarism in this manual. The second act of plagiarism was the guidelines for email which I modified from those given by Dr. Catania in Psychology, with his permission. The definitions below are from the UMBC handbook.

Definitions:

Cheating: Knowingly using or attempting to use unauthorized material, information, or study aids in any academic exercise.

Fabrication: Intentional and unauthorized falsification or inventions 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.

My Comments:

Although I have no reason to believe that any of you have or will engage in academic dishonesty, I want to be certain that all of you know my policies on dishonesty. I feel very strongly that the cheating student denigrates and lessens the value of the grades received by those students who are honest. Cheating cheapens the degrees offered by this university.

In this course, penalties for academic dishonesty will range from a '0' on an assignment to an 'F' in the course with recommendation for expulsion from the university. I will expound a bit on each of the items listed above. All instances, even those with minimal penalty will be reported to the Academic Conduct Committee of the University.

Cheating: Unauthorized material can be a crib sheet, another student's quiz, exam, or lab report, a discussion with a student who has already taken the quiz or exam or completed the lab report, cell phone calls and other methods upon which I wish not to expound.

Fabrication: This infraction usually involves 'made up' data. Don't do that. You will be recording all your observations in your lab notebook; you will be reporting these results on your lab report. If your results don't make sense, see me or your TA. We will help to make sense of them or maybe give you some data to work with. If this occurs, you must **still** report your own data and give attribution for any data provided.

Facilitating Academic Dishonesty: Simply refuse to discuss any work you have completed. Don't give another student your lab report (or note book) to provide an example of how to do the write up. This will be detected and you and the student who 'borrowed' your work will receive '0's the first time, an 'F' the second time.

Plagiarism: Any work or results you write about which are not your own should be cited. If material is lifted verbatim it should be quoted and cited. You knew that. Doing this a lot will not be penalized for academic misconduct but will be graded harshly since merely using other's thoughts and words tells us nothing about what you know. Understand that material used to provide information which you use to develop your own words must also be cited. I see this happening often in lab reports. Don't do it.

In BIOL 109:

Quizzes: Anyone caught cheating on a quiz will receive a '0' on the quiz on the first offense; an 'F' in the course the second time.

Lab Reports: Same as with quizzes. This can be a bit tricky. I encourage you to work together to figure out what things mean or to find information in the text or on the web.

However,

- DON'T paraphrase from the lab manual, or any other publication, without citation.
- DON'T copy calculations.
- DON'T write the reports side by side.
- DON'T check your report against another student's.
- DON'T let anyone check his/her report against your completed report.
- DO ask the instructor or a TA if you are having trouble.

Exams: If you cheat, you fail. Period.

Presentations: You will be working with a group and presumably using reference material. Cite it all. Each of you will have specific jobs within your group. You will be wise to check the others' work to make sure it hasn't been plagiarized. If it has been, all members of the group will receive a "0" on the presentation.

There is a strong (and overdue) movement from the administration encouraging faculty to do everything possible to eliminate academic misconduct. To this end, any infraction will be filed with the Academic Conduct Committee. They keep records which will remain confidential unless subsequent incidents are reported for the same student (in the same class or a different one). If this occurs, the Academic Conduct Committee may impose a more severe penalty than I have imposed. J.W. Sandoz, S.M. Caruso

X. A few last words

- a. We assume you are taking this course to learn some biology in a laboratory setting, and not simply to fulfill a lab requirement.
- b. Any meaningful science laboratory will require that you spend some non-lab time reading for the lab and writing lab reports.
- c. You will be expected to have familiarized yourselves with the day's lab exercise before coming to lab.
- d. The instructors will use the Socratic Method in teaching. Thus, don't be surprised if your instructor responds to your questions with another question. We are encouraging you to become an independent and self-reliant scientist.
- e. Some labs won't "work". Such failures may be the result of the instructor and/or student prep error(s). We can all learn from such errors. They happen to professional scientists too. We, and you, should try not to make the same error twice.
- f. Science is fun. Don't be afraid to enjoy the class, you may find that some of the experiments are actually interesting.
- g. The only dumb question is the one that isn't asked. Ask if you don't understand something.

Lab Safety Rules

- ___ No eating, drinking, or placing anything into your mouth in the lab. This includes pencils and fingernails.
- ___ No applying cosmetics, lip balm, eye drops, etc. (Keep your hands away from your face).
- ___ Report any broken glass immediately. There is a “Sharps Box” in the corner of the lab for broken glass or other sharp objects. Don’t throw these into the regular trash.
- ___ Closed toed shoes are required. No sandals. No exceptions.
- ___ Tie long hair back. It can be caught in equipment or can catch fire.
- ___ If there is an alcohol fire, let the people around you know and smother it with an inverted ice bucket. If there is any other type of fire, pull the fire alarm and evacuate the building.
- ___ If the fire alarm sounds, shut off your gas jet and evacuate the building. Don’t assume it is a false alarm.
- ___ Know where the fire extinguisher and First Aid kit are.
- ___ If you have any cuts or scrapes on exposed skin, be sure they are covered with a band aid BEFORE you come to lab.
- ___ Report any accidents at once.
- ___ Report any bacterial or chemical spills at once.
- ___ Gloves will be available should you desire them for any of the labs. You will be instructed if they are necessary.
- ___ Dispose of biologicals properly. They go into the autoclave bag. ONLY biologicals go into the autoclave bag. Not paper towels or other trash.
- ___ No one is allowed in the lab except for students, faculty, and staff. No friends or others.
- ___ Use common sense.
- ___ If you don’t know, ask.

I have read and understand all of the rules listed above.

Signed _____

Date _____

Print Name _____