

6. Describe different types of macromolecules found in all organisms and discuss the relationship between their structure and function.
7. Identify cells as the basic units of life and describe cell structure in prokaryotes and eukaryotes.
8. Discuss the nature of enzymes and how they affect biological reactions.
9. Describe key biochemical pathways for energy acquisition and utilization in living systems.
10. Apply principles of inheritance at molecular and organismal levels and recognize different mechanisms for reproduction.
11. Explain how DNA controls cell structure and function and transfers this information to future generations.
12. Describe the theory of evolution and role of natural selection.

Special Needs Inform the Office of Learning Services (Lyle Hall) and your instructor immediately if you have disabilities or special needs that might affect your performance in this course. They will do their best to accommodate you.

Attendance Lab & Recitation: Attendance is required.

Participation Participation in lab is expected.

Honesty Cheating or plagiarism results in a zero for the assignment or exam, or worse. There is no distinction between copying or providing answers in this regard. Millersville University's Academic Honesty Policy is found in the 2016-2017 Undergraduate Catalog on pp 71-73 (<http://www.millersville.edu/~ucatalog/index.pdf>).

Title IX Millersville University and its faculty are committed to assuring a safe and productive educational environment for all students. In order to meet this commitment, comply with Title IX of the Education Amendments of 1972, 20 U.S.C. §1681, et seq., and act in accordance with guidance from the Office for Civil Rights, the University requires faculty members to report to the University's Title IX Coordinator incidents of sexual violence shared by students. The only exceptions to the faculty member's reporting obligation are when incidents of sexual violence are communicated by a student during a classroom discussion, in a writing assignment for a class, or as part of a University-approved research project. Faculty members are obligated to report to the person designated in the University Protection of Minors policy incidents of sexual violence or any other abuse of a student who was, or is, a child (a person under 18 years of age) when the abuse allegedly occurred.

Information regarding the reporting of sexual violence, and the resources that are available to victims of sexual violence, is available at <http://www.millersville.edu/sexualviolence/index.php>.

Grading

Lab and recitation are allotted 350 “course points” that contribute to your overall course total of 700 points as outlined in the lecture syllabus. Regardless of the number of points your lab/recitation instructor assigns in lab or recitation, your final lab or recitation score will be scaled to the 350 course points allotted by Drs. Hardy or Klosinska. The 350 lab/recitation points are distributed as follows:

Quiz #1: Skills	20
Quiz #2: Biological Chemistry	20
Quiz #3: Microscopy & Cells	20
Quiz #4: Enzymes	20
Quiz #5: Photosynthesis & Respiration	20
Quiz #6: Chromosomes & Mitosis	20
Quiz #7: Meiosis & Mendelian Genetics	20
Quiz #8: DNA & Genes	20
Assignment #1: Membrane Report	20
Assignment #2: Enzymes SDE Report	30
Assignment #3: Soybean Report	50
Assignment #4: Oral Report	20
Assignment #5: Fruit Fly Report	40
Participation	30
	<hr/>
	350 pts

Missed Assignments or Quizzes: You cannot receive credit for any quiz or assignment based on an activity in which you did not participate. Excused quizzes must be made up in a another lab that same week.

Late Assignments: Late assignments may be reduced by 10% per day.

Missed Labs: If you know in advance that you will miss a lab or recitation, you must arrange (in advance) to make it up with another instructor that same week, and then inform your instructor of the arrangements. Receiving credit for such special arrangements is at your registered instructor’s discretion only. In case of illness or emergency, it may be possible to make up the lab in another section, again at your instructor’s discretion. Lab and Recitation attendance will, among other considerations, be included in your participation grade.

Lab & Recitation Schedule

Note #0: Due dates on quizzes and assignments are tentative, please see your Section Instructor for details.

Note #1: See Syllabus Appendix 1 for rules of conduct.

Note #2: See Syllabus Appendix 2 for Notebook Guidelines.

Note #3: See Syllabus Appendix 3 for Oral Report Guidelines

Week	Week of..	Recitation (M)	Lab (T, W, R or F)	Quiz or Assignment Due
1	Aug 28	Introduction	Skills Laboratory	
2	Sep 04	No recitation (Labor Day)	Soybean Experiment Design (Exp. proposal handed in)	
3	Sep 11	Set up Soy Experiment	Biological Chemistry;	Quiz 1: Skills;
4	Sep 18	Review	Microscopy & Cell Structure	Quiz 2: Biological Chemistry
5	Sep 25	Review	Membranes	Quiz 3: Microscopy & Cells
6	Oct 02	Fruit Fly Exercises & Exp. Setup	Enzymes (Canned Exp. & SDE Design)	Assignment 1: Membranes Report
7	Oct 09	No recitation (Fall Break)	T: No lab (Fall Break) W-F: TBA	
8	Oct 16	Prep for Enzymes SDE	Enzymes SDE – Bring camera to document.	Quiz 4: Enzymes
9	Oct 23	Review	Photosynthesis & Respiration	Assignment 2: Enzymes SDE Report
10	Oct 30	Review	Chromosomes & Mitosis	Quiz 5: Photosynthesis & Respiration
11	Nov 06	Review	Meiosis & Mendelian Genetics	Quiz 6: Chromosomes & Mitosis
12	Nov 13	Review	Soybean Harvest – bring camera for documentation	Quiz 7: Meiosis & Mendelian Genetics
13	Nov 20	Discuss oral reports	T: Population Genetics W-F: (Thanksgiving Recess)	
14	Nov 27	Finalize fruit fly data, discuss assignment.	DNA, Gene Function & Biotechnology	Assignment 3: Soybean Report
15	Dec 04	Quiz 8: DNA & Genes	Oral Report	Quiz 8: DNA & Genes Assignment 4: Oral Rep.
16	Dec 11	Monday recitation. Attendance required.	No lab (finals week)	Assignment 5: Fruit Fly Report

Appendix 1: Laboratory & Recitation Rules.

1. **Be on time.** There is a lot of material to cover in the allotted time. It is disruptive of the entire class for you to arrive late.
2. **Read the material assigned before coming to lab and recitation.** It is inconsiderate of your lab partners and a waste of time if you don't know what is going on.
3. **Dress appropriately for lab.** Open-toed shoes are not permitted; this is for your safety.
4. **No food or drink.** This is for your protection!
5. **No cell-phones** or iPods, etc. Any behavior that disrupts the class will result in a deduction from your grade.
6. **Come prepared.** Bring a notebook or extra paper, graph paper, simple calculator, metric ruler, pen and pencil to class.
7. **Clean up** work area before leaving the room.
8. **Check for e-mail.** In the event that I need to contact you, I will use the **campus e-mail system only.**

Appendix 2: Keeping a Lab Notebook.

Each student is required to keep a lab notebook containing the lab manual, all graded quizzes and assignments, all additional materials (e.g., data tables, observations, procedures and results, etc. from your student designed experiments), and any other handouts, accompanied by notes taken in lab or recitation during the semester. You must bring this notebook to each and every lab and recitation meeting. This is especially important for your student-designed experiments and the long-term group experiments with soybeans and fruit flies. It is expected that ALL material will be completed whether or not it is collected and graded. The notebook should be neatly organized such that you or your instructor can find any item quickly and easily. As such, there will need to be a master Table of Contents at the front that you create, and this table of contents will not simply be that from your lab manual since you will have more than just your lab manual in your notebook. The lab notebooks may be checked periodically through "spot-checks" by your instructor and these checks may contribute to your participation point total. Other key points are as follows:

Identity: your lab notebook should have the course name, number and your full name on the outside of it.

Organization: A typed, master Table of Contents, clearly labeled tabs to facilitate quick retrieval of an item, logical order and grouping of materials, and overall neatness is expected.

Clarity & Legibility: data and notes detailed, legible and logical;

Completeness: all lab handouts present and completed, all quizzes, all assignments, notes, procedures, data, and figures from all experiments;

Student-designed and long-term experiments: In addition to the final reports, include explanations of the purpose, preliminary notes, procedure or flow diagram, supply list, raw data (data tables), experimental notes (observations), manipulated data (graphs), additional material (e.g., photographs) and conclusions.

Appendix 3.

Oral Report on a Student Designed Experiment: Grading Guidelines (Assignment #4)

Notes:

1. Your oral presentation should be a group effort. Every member must contribute equally. Assuming that each member contributes equally, each member may receive the same grade regarding content, but overall presentation grades within a group may vary depending on each individual's performance regarding presentation style (i.e., eye contact, speaking volume and clarity, speaking time, etc.). If a student is not present for the presentation, they will receive a zero for the presentation.
2. The actual presentation should be 10 minutes in duration. Don't have your talk too short or too long.
3. Presentations will be followed by a 5 minute period of questions and discussion from the audience.
4. Presentations should be in PowerPoint and you should be sure they work on the Mac version of the program.
5. Please hand in one printed copy of your PowerPoint to your instructor the day of the presentation.
6. Please show up to lab early to load your presentation onto the instructor's computer and to make sure your presentation is working correctly.

Introduction:

1. Provide a title slide that includes a descriptive title for your research and lists all of the names of students that contributed to the oral presentation. Below your names, provide the name of the institution you represent (e.g., Millersville University, Biology 101 – Fall 2017).
2. Describe the basic idea behind your experiment(s). If you are reporting on the enzymes Student Designed Experiment, for example, then you should review your results of the canned Enzymes lab and then how your designed experiment expands upon or differs from that. If you are reporting on the soybean experiment, then you will not have a previous experiment of yours to review, but there is still plenty of information on factors that affect plant growth and/or productivity generally or on soybeans specifically for you to review for your audience.
3. What hypothesis(s) did you test and what was the biological basis for the hypothesis you formulated?
4. What species and, if possible, subspecies or variety of plant(s) were you working with? Give the scientific and common names of it and provide the audience with background on the biology, natural history and economic importance of the plant you worked with.
5. Cite sources (e.g., text book, scientific papers, other) that you used to collect the information presented in your introduction.

Methods:

1. Provide a highly simplified flow diagram that provides the audience with a quick yet sufficiently thorough overview of your experiment.
2. Provide a diagram(s) or picture(s) along with oral explanation of the general technical set-up for your experiment(s).
3. Be sure the audience (other students) understands your experimental design.

Results & Conclusions:

1. Present figures (graphs and photos if informative) showing your results for each component of your investigation. Explain how these data support or refute your hypothesis(s). Your figures should have easily readable legends including titles below the figure, and all axes should be labeled correctly and clearly.
2. Present the results of appropriate statistics with your results.
3. Provide a slide summarizing future directions that should be taken to further explore the process.

Presentation Style:

1. Did you all speak clearly and with adequate volume?
2. Were your slides neat and readable even from the farthest part of the room?
3. Was your presentation of an appropriate length? Not too long or too short?
4. How did you handle questions from the audience?
