

WINDWARD COMMUNITY COLLEGE

BIOL 171L General Biology Lab I

CRN 60235 * 01 Credits * M 5:30-8:15 p.m.

INSTRUCTOR:	David A. Krupp, Ph.D.
OFFICE:	Hale 'Imiloa 121A
OFFICE HOURS:	MW 4:00 -5:00 PM; R 3:30 – 4:30 PM
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EFFECTIVE DATE:	Fall 2015

WINDWARD COMMUNITY COLLEGE MISSION STATEMENT

Windward Community College offers innovative programs in the arts and sciences and opportunities to gain knowledge and understanding of Hawai'i and its unique heritage. With a special commitment to support the access and educational needs of Native Hawaiians, we provide O'ahu's Ko'olau region and beyond with liberal arts, career and lifelong learning in a supportive and challenging environment — inspiring students to excellence.

CATALOG DESCRIPTION

Laboratory to accompany BIOL 171. (3 hrs. lab)

REQUIREMENTS COURSE SATISFIES

WCC: Fulfills a requirement for the AS in Natural Sciences degree in the biological science concentration (NSCI-BSC).

Also fulfills AA in Liberal Arts degree Natural Science diversification requirements as a science laboratory course (DY).

UHM: Fulfills UHM Natural Sciences diversification requirement as a science laboratory course (DY). This class may also fill one of the major requirements for a Bachelor of Arts (BA) or Bachelor of Science (BS) degree in any of the biological sciences.

PREREQUISITES

Credit for or registration in BIOL 171.

RECOMMENDED PREPARATION

High school chemistry or college chemistry.

STUDENT LEARNING OUTCOMES

The student learning outcomes for the course are:

- Use the scientific method of inquiry to investigate biological phenomena.
- Apply the concepts learned in BIOL 171 to an experimental and hands-on observational setting.
- Collect, reduce, and interpret biological data.
- Prepare written objective reports describing and interpreting experimental and observational results.
- Demonstrate the use of some of the standard tools of the biological scientist, such as microscopes, scales, spectrophotometers, computers, and other analytical tools.
- Apply the standard analytical procedures of biology, such as chromatography, biochemical analyses, preparation of materials for microscopic examination, culture techniques, and statistical procedures (descriptive statistics and hypothesis testing).

COURSE CONTENT*Concepts or Topics*

- Collecting data and making measurements
- Descriptive statistics and presenting data
- Accessing literature resources
- How to write a scientific review paper
- Biological molecules
- Using the microscope
- Diversity of cells and cell structure
- Enzyme kinetics
- Cellular respiration and fermentation
- Light reactions of photosynthesis
- Mitosis, meiosis and chromosomes
- Mendelian genetics
- DNA extraction and electrophoresis
- The polymerase chain reaction (PCR)
- Bioinformatics

Skills or Competencies

1. Maintain a laboratory notebook that adequately documents laboratory activities.
2. Collect quantitative measurements and make calculations (including conversions) using the metric system.
3. Calculate averages and standard deviations.
4. Perform simple statistical hypothesis testing.
5. Present quantitative data in the form of tables and graphs in the proper format suitable for publication in a scientific journal.
6. Use Excel software to compute statistics, create data tables, and generate graphs.
7. Draw figures illustrating observations and present these figures in a manner suitable for publication in a scientific journal.
8. Write summaries of laboratory activities, documenting these activities and demonstrating an understanding about the significance of the results.
9. Use information retrieval technologies to access literature sources for a research paper.
10. Write a scientific research review paper and a biological topic.
11. Use laboratory instruments: rulers, electronic scales, microscopes, spectrophotometers, respirometers, centrifuges, thermal cyclers, electrophoretic apparatus, etc.
12. Demonstrating knowledge of the theoretical principles involved, successfully carry out the following analytical procedures: qualitative analyses of biological molecules, separation of biological compounds using chromatography and electrophoresis, enzyme kinetics, preparation microscopic specimens for examination (including proper staining), respirometry, photosynthesis, cultivation of bacteria, extraction/measurement of nucleic acids, polymerase chain reaction, bioinformatics to analyze DNA sequences.
13. Recognize different kinds of cells and their structures: protists, plant cells, animal cells, and bacteria cells.
14. Recognize the stages of meiosis and mitosis in plant and animal cells.
15. Predict parental and offspring genotypes and phenotypes using the principles of Mendelian genetics.

COURSE TASKS, ASSESSMENT AND GRADING

LABORATORY NOTEBOOK The student will maintain a laboratory notebook to record all notes, observations, and information gathered before and during laboratory activities. This notebook must be brought to every laboratory period. **FAILURE TO BRING THE LAB NOTEBOOK PROPERLY PREPARED FOR THE DAY'S LAB ACTIVITY WILL RESULT IN A 10 POINT REDUCTION IN THE STUDENT'S TOTAL POINTS FOR EACH OCCURRENCE.** This notebook will be collected and graded twice during the semester (30 points for the first collection; 30 points for the final collection; 60 points total). The type of notebook and the kind of information required will be explained during the introductory lab session.

LABORATORY SUMMARIES The student will complete a total of 12 written laboratory summaries (20 points each). Each summary must be completed and turned in no later than the beginning of the first laboratory meeting after the assignment was given (240 points total). The production of laboratory summaries should be considered an individual student task. The sharing of data tables and graphs between students is considered a form of plagiarism and is inappropriate. **LATE SUMMARIES RECEIVED WITHIN ONE WEEK OF THE DUE DATE WILL BE ASSESSED AN AUTOMATIC PENALTY OF 3 POINTS. SUMMARIES WILL NOT BE ACCEPTED IF SUBMITTED MORE THAN ONE WEEK FOLLOWING THE DUE DATE.**

LIBRARY RESEARCH PAPER The student will complete a short formal library research report (scientific review paper) on an approved biology topic in the form of a typical scientific review paper. The primary purpose of this assignment is to introduce you to literature searches, scientific writing, citation procedures, and bibliography formatting. Specific details on the assignment and format of this report will be presented in class (20 points total). **A LATE REPORT RECEIVED WITHIN ONE WEEK OF THE DUE DATE WILL BE ASSESSED AN AUTOMATIC PENALTY OF 5 POINTS. THE REPORT WILL NOT BE ACCEPTED IF SUBMITTED MORE THAN ONE WEEK FOLLOWING THE DUE DATE.**

PRE-LAB QUIZZES The student will take a total of 13 pre-lab quizzes (15 points each) administered via Laulima before the laboratory meetings. These quizzes will test the student's knowledge of and preparation for the laboratory exercise planned for that day, as well as the student's understanding of the previous laboratory activity. In addition, the student take one lab safety quiz (15 points). In general, these quizzes will be posted on the Laulima site the Tuesday prior to the upcoming lab meeting. Access to the quiz will be prohibited beginning one hour before the lab meeting. Of these 14 quizzes, only the 10 best scores will be included in the student's point total (150 points total). **NO MAKE-UP QUIZZES FOR ANY ABSENCES (EVEN RESULTING FROM LEGITIMATE ILLNESS) WILL BE ADMINISTERED.**

LABORATORY PRACTICAL EXAMS. The student will take two laboratory practical examinations (one midterm exam and one non-cumulative final exam; 100 points each) to demonstrate acquisition of laboratory skills and an understanding of information presented during laboratories.

LABORATORY ATTENDANCE Regular attendance is expected. Because laboratories involve considerable set-up/take-down time and supervision, students will **NOT** be able to make up missed laboratory activities. A student missing a scheduled laboratory activity because of a documented illness or legitimate emergency may be given an alternative activity, at the instructor's discretion, to make up lost lab summary points. In such a circumstance, the student is

still responsible for the information presented during the missed laboratory session. Regardless of the reason, ***A STUDENT MISSING MORE THAN TWO REGULARLY-SCHEDULED LABORATORY SESSIONS WILL NOT RECEIVE CREDIT FOR THE COURSE.*** The student should also be aware that missing a laboratory session may negatively impact the student's opportunity and/or ability to complete a laboratory report for a missed session.

LAB ATTIRE, CONDUCT AND HYGIENE Because biology labs often involve working with hazardous materials and living organisms, students must dress appropriately. Students must wear lab coats and closed-toe shoes in the lab. Students may purchase a lab coat at the college bookstore. In addition, some lab activities will require students to wear gloves and safety glasses (provided by the college). Students failing to dress appropriately for lab will not be permitted into the laboratory and will be considered to be absent for the missed lab activity. Students engaged in conduct that threatens the safety of themselves and others in the lab will be refused access to the lab for the remainder of the semester and will receive an "F" for the course. Students are also expected to clean up their workstations following the lab activities. Failing to do so will lead to a 5-10 point penalty depending upon the seriousness of the infraction.

The assignment of points will be according to the following protocol:

Practical Examinations	200	points
Pre-Lab Quizzes	150	points
Laboratory Notebook	60	points
Laboratory Summaries	240	points
<u>Library Research Report</u>	<u>20</u>	<u>points</u>
TOTAL	670	points

Letter grades will be assigned as follows:

A	90% or above in total points and not missing more than one scheduled laboratory activity.
B	80-89.9% of total points and not missing more than one scheduled laboratory activity.
C	65-79.9% of total points and not missing more than one scheduled laboratory activity.
D	55-64.9% of total points and not missing more than one scheduled laboratory activity.
F	Below 55% of total points or informal or incomplete official withdrawal from course, or if a student misses more than one scheduled laboratory activity for reasons other than documented illness or emergency.
I	Incomplete; given at the INSTRUCTOR'S OPTION when student is unable to complete a small part of the course because of circumstances beyond his or her control. It is the STUDENT'S responsibility to make up incomplete work. Failure to satisfactorily make up incomplete work within the appropriate time period will result in a grade change for "I" to the contingency grade identified by the instructor (see catalog); may be issued if documented serious illness or emergency forces a student to miss more than one scheduled laboratory activity.
CR	65% or above in total points; the student must indicate the intent to take the course as

	CR/NC in writing by the end of the 10th week of classes (see catalog).
NC	Below 65% of total points; this grade only available under the CR/NC option (see above and see catalog).
N	NOT GIVEN BY THIS INSTRUCTOR EXCEPT UNDER EXTREMELY RARE CIRCUMSTANCES (e.g., documented serious illness or emergency that prevents the student from officially withdrawing from the course); may be issued if documented serious illness or emergency forces a student to miss more than one scheduled laboratory activity; never used as an alternative for an "F" grade.
W	Official withdrawal from the course after the third week and prior to the end of the 10th week of classes (see catalog).

Waiver of minimum requirements for specific grades may be given only in unique situations at the instructor's discretion.

Students involved in academic dishonesty will receive an "F" grade for the course. Academic dishonesty is defined in WCC's college catalog.

LEARNING RESOURCES

Adams, B.J, and J.L. Crawley. 2013. Van De Graaff's Photographic Atlas for the Biology Laboratory, Seventh Edition. Morton Publishing Company. 288 pp. (ISBN 9781617310584)

Descriptions of laboratory assignments and activities will be made available at the course Laulima site and/or distributed in class.

STUDENT RESPONSIBILITIES

Students should carefully review the attached sheet detailing inherently dangerous activities of this course and sign the appropriate U.H. Assumption of Risk and Release and Medical Consent forms.

Students are expected to participate in all laboratory activities and complete all course assignments on time.

Students are expected to be prepared in advance when they arrive to class. Being prepared includes the following: having already read text materials (e.g., textbook readings and handouts) assigned for that day's activities, bringing required work materials (e.g., lab notebook, textbook, handouts, writing supplies, etc.), and having completed any assigned pre-lab tasks.

Any changes in the course schedule, such as examination dates, deadlines, etc., will be announced ahead of time in class. It is the student's responsibility to be informed of these changes.

It is the student's responsibility to be informed about deadlines critical to making registration changes (e.g., last day of erase period and last day for making an official withdrawal).

The student should understand that BIOL 171L is a difficult course for students intending to major in one of the biological sciences. Thus BIOL 171L requires much time and serious

dedication. If the student does not have a strong background or interest in science, the student does not belong in this lab course.

BIOL 171L LABORATORY ACTIVITIES

Students enrolled in BIOL 171L are advised that certain required course activities are inherently dangerous and may require normal physical abilities. Students are therefore required to read about the inherently dangerous activities described below. In addition, students must read and demonstrate knowledge of their responsibilities while engaged in these activities.

Some students may have physical conditions that restrict their participation in certain laboratory activities. Respiratory ailments, certain allergies, and pregnancy may be among these conditions. Students exhibiting any of these conditions, or any other condition that may be impacted adversely by participation in the activity, should consult a physician.

INHERENTLY DANGEROUS ACTIVITIES IN THE BIOLOGY LABORATORY

Students may be exposed to chemicals (e.g., formaldehyde, organic solvents, acids, and other caustic chemicals), chemical fumes, laboratory equipment and supplies (e.g., scalpels, razor blades, glass slides, coverslips, and electrical equipment), toxic or irritating properties of living and dead animals, human organic matter (e.g., saliva and blood), and other materials necessary to laboratory activities of this or other laboratory classes. Other possible hazards include broken glass on the floor or counters, combustible materials (e.g., bunsen burner gas), and slippery spills.

RESPONSIBILITIES OF STUDENTS IN THE LABORATORY

1.	Students should be familiar with safety procedures and take appropriate precautions at all times to insure the safety of every student in the lab.
2.	Students should follow instructions carefully, especially when hazardous conditions occur or hazardous materials are being used.
3.	Students should locate the placement of safety equipment and supplies in the laboratory: safety shower, eye wash station, fire extinguisher, and first aid kit. Students should understand the use of this equipment. Also note the locations of exits.
4.	Anyone injured in the lab, should inform the instructor immediately and take immediate action to reduce the risk of further injury.
5.	Students should familiarize themselves with the fire procedures. Extinguish small fires, but leave the building immediately should a major fire occur. Notify the appropriate authorities -- don't assume someone else remembered to do it. Meet with other students and your instructor outside the building before leaving so that an accurate headcount may be made.
6.	Students should dress appropriately in the lab. Students may elect to supply their own gloves and protective aprons or laboratory coats. Some lab activities may require protective eyewear (provided for the activity by WCC).

7.	Students should report all hazardous conditions to the instructor immediately.
8.	Chemicals may be poisonous, corrosive, or flammable. No chemicals, even chemicals known to be safe, should be ingested, inhaled, or touched unless specifically directed to do so by your instructor.
9.	All organisms, living or dead, should be treated with care and respect. Avoid direct handling when possible.
10.	The safe use of specific equipment and tools (e.g., microscopes, slides, scalpels, and pipettes) will be demonstrated by the instructor during the laboratory sessions. Students should be sure they understand this usage.
11.	Students should clean up any supplies used and should return materials where they belong as instructed. Any material spilled should be cleaned appropriately. Report and hazardous spills or breakages.
12.	Broken glass and sharp metal waste should be placed only in those receptacles marked for such disposal -- do not put these materials in normal trash receptacles.
13.	Some chemical wastes may not be dumped into laboratory sinks. In such circumstances an appropriate container will be provided for this waste in the lab.
14.	Organic waste resulting from animal dissection activities should be disposed of in the appropriate receptacle, not the ordinary trash receptacles.
15.	Human organic materials (e.g., saliva and blood) must be disposed of in such a way as to eliminate any possibility for contamination and the spread of disease. Appropriate handling and disposal procedures will be explained when human materials are involved in the laboratory exercise.
16.	Clean up the laboratory area: remove and dispose of all trash; return supplies and equipment to appropriate locations; and disinfect bench area.
17.	After completing laboratory activities and clean up, students should wash their hands in the restroom to avoid spreading contamination and hazardous chemicals.
18.	The laboratory is a place for learning. Therefore, eating, drinking, and playing around is prohibited during the laboratory session. Students exhibiting unsafe or inappropriate behavior in the lab may be asked to leave and may be given an "F" grade for the course.

BIOLOGY 171L
General Biology Lab I
Fall 2015 Schedule of Lab Activities

DATE	LABORATORY TOPIC
24-Aug	Lab 0 - Introduction to the Biology Lab
31-Aug	Lab 1- Making Measurements and the Metric System
7-Sep	LABOR DAY - NO CLASS
14-Sep	Lab 2 - Descriptive Statistics, Presenting Data and Graphing Relationships
21-Sep	Lab 3 - Biological Molecules
28-Sep	Lab 4 - Using the Microscope and Observing Cells
5-Oct	Lab 5 - Enzyme Kinetics
12-Oct	Lab 6 - The Scientific Research Paper and Literature Resources
19-Oct	Lab 7 - The Light Reactions of Photosynthesis
26-Oct	<i>First Laboratory Practical Examination (Labs 0-6)</i>
2-Nov	Lab 8 - Mitosis, Meiosis and Chromosomes
9-Nov	Lab 9 - Mendelian Genetics
16-Nov	Lab 10 - The Polymerase Chain Reaction (PCR)
23-Nov	Lab 11 - DNA and Protein Electrophoresis)
30-Nov	Lab 12 - Bioinformatics
7-Dec	Lab 13 - Prokaryotes
14-Dec	<i>Final Laboratory Practical Examination (Labs 7-13)</i>