

## **BIOL 171 Introduction to Biology I**

CRN 61116 \* 03 Credits

<b>INSTRUCTOR:</b>	David A. Krupp, Ph.D.
<b>OFFICE:</b>	Hale 'Imiloa 121A
<b>OFFICE HOURS:</b>	Tu 9:30-10:30 am; W 2:30-3:30 pm; or by appointment
<b>ONLINE OFFICE HOUR</b>	M 7:00-8:00 pm (via Blackboard Collaborate)
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<b>EFFECTIVE DATE:</b>	Spring 2016
<b>COURSE WEBSITE:</b>	<a href="http://krupp.wcc.hawaii.edu/BIOL171/Biol171S16.htm">http://krupp.wcc.hawaii.edu/BIOL171/Biol171S16.htm</a>
<b>LAULIMA URL:</b>	<a href="https://laulima.hawaii.edu/portal">https://laulima.hawaii.edu/portal</a>

### **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**

First semester of introductory biology for all life science majors. Topics include: Overview of the science of biology; Cell structure, chemistry, growth, and reproduction; Classical, chromosomal and molecular genetics; Evolution, phylogeny and systematics; and Biology and diversity of viruses and bacteria. (3 hrs. lect.)

### **RECOMMENDED PREPARATION**

- High school chemistry or CHEM 151
- Concurrent enrollment in BIOL 171L
- Concurrent enrollment in CHEM 161

### **STUDENT LEARNING OUTCOMES**

*By the end of this class, the student should be able to*

- Develop and evaluate a scientific hypothesis.
- Describe cell structure and function.
- Describe how genetic characteristics are passed from generation to generation and how they are manifested into the characteristics of the whole organism.
- Explain how the process of biological evolution influenced the history of life on our planet.
- Classify living things into a hierarchical system of groups based upon morphology, genetics, and phylogeny.
- Describe the characteristics, systematics, and biology of viruses and bacteria.

## COURSE LECTURE TOPICS

- Science as a Way of Knowing
- The Characteristics of Living Things
- The Chemistry of Life: Atoms and Molecules
- The Chemistry of Life: Properties of Water
- The Chemistry of Life: Biological Molecules
- Cell Structure and Function
- Membrane Transport Processes
- Energy and Life
- Cellular Respiration
- Photosynthesis
- Plant Adaptations to Arid Environments
- Cell Communication
- Reproduction of Cells: The Cell Cycle
- Reproduction of Cells: Mitosis and Cytokinesis
- Meiosis and Sexual Life Cycles
- Classical Mendelian Genetics
- Beyond Mendel (multiple allelic inheritance, polygenic inheritance, pleiotropy, epistasis, co-dominance, incomplete dominance, linkage and crossing over, genomic imprinting, cytoplasmic inheritance, chromosomal aberrations)
- The Molecular Basis for Inheritance
- Control of Gene Expression
- Regulation of Gene Expression During Embryonic Development
- The Molecular Genetics of Viruses
- Introduction to Biotechnology
- Darwin's Evolutionary Paradigm
- Microevolution: The Evolution of Populations
- The Origin of Species
- Macroevolution
- The History of Life
- Classification and Systematics
- Prokaryotes

## MODE OF INSTRUCTION

*The previously described outcomes will be achieved through the aid of the following learning activities:*

- Lecture presentations and demonstrations (these may be televised or viewed as downloadable podcasts from the course Laulima site).
- Internet-assisted activities and resources (e.g., Laulima and course website).
- Readings from textbook and instructor's lecture outlines and study guides (lecture outlines and study guides downloadable as pdf files from the course Laulima site).
- Engagement essays about capacious topics relevant to biology.
- Quizzes and examinations assessing the students' understanding of course content.

## COURSE TASKS, ASSESSMENT AND GRADING

**ENGAGEMENT ESSAYS.** The student will complete two essays (25 points each) that deal with capacious topics relevant to biology as defined by the posted assignments. Each essay will present a thoughtful, objective, well-reasoned, organized and documented point of view regarding each topic. There will be a total of two such essays assigned throughout the semester. Each will be worth 25 points (50 points total). Essays must be double-spaced typed using a 12-point standard font such as Times, Arial, or Geneva with one inch margins all the way around. Assessment rubrics will provide the student with guidance about how to approach each essay topic. Assignments must be submitted by the assignment deadline. *Assignments received after this deadline (but before one week after the deadline) will receive an automatic deduction of five points. Late assignments received one week or more after the deadline will not be accepted and the student will receive a score of 0 for that assignment.*

**QUIZZES.** The student will take a minimum of ten quizzes (15 points each; 150 points total) administered through the Internet (Laulima) during specified time periods (but not during class sessions). These quizzes will address the detailed content and major concepts presented in the lectures, lecture outlines, text readings, and study guide activities. If the student takes more than ten quizzes, (there may be 12-14 quizzes in all) only the best ten quiz scores will be used in calculating the student's total points. Since these quizzes may be taken using home computers connected to the Internet, students may refer to instructional resources (text, study guide, lecture notes, etc.) while taking the quizzes. However, the quizzes will be timed, the student having only 20 minutes to complete each quiz. In general, a quiz will be available for about a week (but the duration of availability period may vary from quiz to quiz). Students should expect to take at least one quiz per week. But sometimes more than one quiz will be posted at the same time. *No make-up quizzes for missed quizzes will be administered for ANY REASON, including illness or family emergency (the student will receive no score for missed quizzes). Quizzes missed or receiving zeros or low scores because of computer and/or Internet problems may not be made up either. The student should also note that quizzes are only reviewable from the course Laulima site if the student has taken them. The student should not expect to be able to review quizzes that the student has not accessed from the course Laulima site during the quiz availability period.*

**EXAMINATIONS.** The student will take two non-cumulative midterm examinations (100 points each) and a cumulative final examination (150 points) to demonstrate understanding of information presented primarily during lectures. The first midterm examination will cover information presented during the first third of the course. The second midterm examination will cover information presented during the second third of the course. Two thirds of the final examination will emphasize the final third of the course, while one third of the final will draw on information covered during the first and second thirds of the course. The *closed-book, proctored* examinations will be administered through the Internet using Laulima at your campus' Learning/Testing Center. **NO RETESTS** will be given. A student missing an exam because of a documented illness or emergency may be allowed to take a make-up exam. In such a circumstance, the student should make every reasonable attempt to contact the instructor before the exam is administered to the class (or as soon as possible). While make-up exams will cover the same content area as a missed exam, the exam format and specific questions may be different.

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

Engagement Essays	50	points
Quizzes	150	points
Midterm Examinations	200	points
<u>Final Examination</u>	<u>150</u>	<u>points</u>
TOTAL	550	points

*Letter grades will be assigned as follows:*

<b>A</b>	90% or above in total points.
<b>B</b>	80-89.9% of total points.
<b>C</b>	65-79.9% of total points.
<b>D</b>	55-64.9% of total points.
<b>F</b>	Below 55% of total points or informal or incomplete official withdrawal from course.
<b>I</b>	Incomplete; given at the <b>INSTRUCTOR'S OPTION</b> when student is unable to complete a small part of the course because of circumstances beyond his or her control. It is the <b>STUDENT'S</b> 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).
<b>CR</b>	65% or above in total points; the student must indicate the intent to take the course as <b>CR/NC</b> in writing by the end of the 10th week of classes (see catalog).
<b>NC</b>	Below 65% of total points; this grade only available under the <b>CR/NC</b> option (see above and see catalog).
<b>N</b>	<b>NOT GIVEN BY THIS INSTRUCTOR EXCEPT UNDER EXTREMELY RARE CIRCUMSTANCES</b> (e.g., documented serious illness or emergency that prevents the student from officially withdrawing from the course); never used as an alternative for an "F" grade.
<b>W</b>	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

### *Required Textbook*

Reece, J.B., L.A. Urry, M.L. Cain, S.A. Wasserman, P.V. Minorsky, and R.B. Jackson. 2014. Campbell Biology, Tenth Edition. Benjamin Cummings. San Francisco.

### *Additional Resources*

Lecture outlines, PowerPoint slides (as pdf files), Podcasts, including supplementary podcasts, of the lectures and other resources will be made available on the course Laulima site.

## STUDENT RESPONSIBILITIES

The student is expected to attend and actively participate in all course lectures and activities, and complete all quizzes and examinations on time.

The student is expected to be prepared in advance before the class sessions. Being prepared includes the following: having read text materials (e.g., textbook readings, and lecture outlines) assigned for that day's activities and bringing required work materials (e.g., textbook, handouts, writing supplies, etc.) to the session.

Any changes in the course schedule, such as examination dates, deadlines, etc., will be announced ahead of time in class or on the course Laulima site. It is the student's responsibility to be informed of these changes. Students should visit the course Laulima site at least twice per week.

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 **"INTRODUCTORY" DOES NOT MEAN "EASY"**. Students should expect a level of difficulty comparable to other 100-level science classes intended for majors in the discipline. When difficult concepts and detailed information are presented, it is the student's responsibility to take the appropriate steps to learn and understand these concepts and information.

Science courses at WCC generally require two to three hours of independent private study time for each hour in class. However, because of the nature of the material presented in BIOL 171, more study time may be required (depends upon the student's science/biology background). It is the student's responsibility to allocate the appropriate time needed for study in an environment conducive to quality study. The student must budget time efficiently and be realistic about all personal and professional commitments that consume time.

## HOW TO SUCCEED IN THIS CLASS

Understanding biological science involves understanding many difficult concepts and vocabulary, not just knowing facts. The student should know that the details to these concepts are important. In addition, the student will be introduced to hundreds of new words. In some cases, words that are familiar in a context other than biology will be introduced in the context of

biology. The student will need to understand and use these terms in a biological science context.

While the student will have lecture outlines (downloadable from the course Laulima site), the student will not succeed in this class without taking careful lecture notes and reading the corresponding material in the textbook. The lecture outlines are not to be used in place of the student's own note taking. As soon as possible (best if done on the same day), the student should copy over these lecture notes filling in gaps and missing information by referring to the lecture outlines and textbook. The student should carefully review these rewritten lecture notes as often as possible. In addition to reviewing these notes before an exam, it would be useful for the student to try to rewrite these notes from memory.

In addition to copying over lecture notes, study activities should include drawing labeled diagrams or graphs that illustrate important biological phenomena (e.g., the internal structure of the cell, the stages of cell division, or the anatomy of the heart). These diagrams need not be works of art, but should clearly illustrate significant information. Before an exam, it would be useful to redraw these labeled diagrams and graphs from memory.

The student should make flashcards for each new vocabulary word presented (refer to lecture outlines for a lists of required terms). On one side of the card, write the word. On the other side, write the appropriate biological science definition for the word. The student should use these card for self-testing as often as possible. The student should also practice using the words to explain biological concepts.

The student should do all of the recommended study guide activities and review all of the Internet resource materials provided.

The textbook and the lecture outlines include useful study questions. The student should write out answers to all of these questions as though they were required assignments. Students could exchange these answers and provide constructive feedback to each other.

The student should read the textbook materials corresponding to a particular lecture before and after that lecture.

Students are recommended to establish study groups and study together. The students in these groups may test each other's knowledge and understanding of the information. They may also take turns teaching each other.

The student should ask the instructor to explain the things that the student does not understand.

## **DISABILITIES ACCOMMODATION STATEMENT**

*If you have a physical, sensory, health, cognitive, or mental health disability that could limit your ability to fully participate in this class, you are encouraged to contact the Disability Specialist Counselor to discuss reasonable accommodations that will help you succeed in this class. Ann Lemke can be reached at 235-7448, [lemke@hawaii.edu](mailto:lemke@hawaii.edu), or you may stop by Hale 'Akoakoa 213 for more information.*

**BIOLOGY 171 - Introduction to Biology I**  
**Spring 2016 - CRN 61116**  
**Tentative Televised Schedule of Lecture Topics**

Telecast Type	Days	Times	Channels
Broadcast	MW	4:00 - 5:00 p.m.	EDUTV channel 354 (Oceanic: O'ahu, Kaua'i, and Hawai'i), UHTV channels 355 (Oceanic: Statewide) & 55 (Hawaiian Telcom: O'ahu), UHVod channel 358 (Oceanic: Statewide)
Re-Broadcast	TR	1:30 - 2:30 a.m.	EDUTV channel 354 (Oceanic: O'ahu, Kaua'i, and Hawai'i), UHTV channels 355 (Oceanic: Statewide) & 55 (Hawaiian Telcom: O'ahu), UHVod channel 358 (Oceanic: Statewide), MCTV 354 (Maui only)
Re-Broadcast	Sun	3:00 -5:00 a.m.	EDUTV channel 354 (Oceanic: O'ahu, Kaua'i, and Hawai'i), UHTV channels 355 (Oceanic: Statewide) & 55 (Hawaiian Telcom: O'ahu), UHVod channel 358 (Oceanic: Statewide), MCTV 354 (Maui only)

Broadcast Date	Session Number	Lecture Topics	10th Edition Text Pages
11-Jan	1	Course Introduction	
13-Jan	2	Science as a Way of Knowing	16-24
18-Jan	3	Science as a Way of Knowing (continued) The Characteristics of Living Things Part I	16-24 1-15 70 71 73 77 85
		<b>Review Supplemental Podcast 01 "Examples of the Scientific Method" on the BIOL 171 Laulima Site</b>	
20-Jan	4	The Characteristics of Living Things Part II	1-15 468
		<b>Review Supplemental Podcast 02 "The Chemistry of Life: Atoms and Molecules" on the BIOL 171 Laulima Site</b>	28-41 45 Appendix B-1
25-Jan	5	The Chemistry of Life: Properties of Water	37 44-36 190 1127
27-Jan	6	The Chemistry of Life: Biological Molecules Part I	56-72
1-Feb	7	The Chemistry of Life: Biological Molecules Part II	72-89 149 192
3-Feb	8	The Cell as the Fundamental Unit of Life: Cell Structure and Function	92-124
8-Feb	9	The Cell as the Fundamental Unit of Life: Membrane Transport Processes	124-138
10-Feb	10	Energy and Life: Introduction to Cell Metabolism Part I	141-148 190
15-Feb	11	Energy and Life: Introduction to Cell Metabolism Part II	148-159
17-Feb	12	Cellular Respiration: Harvesting Cellular Energy Part I	149-141 162-172 177-180 189
22-Feb	13	Cellular Respiration: Harvesting Cellular Energy Part II	162-182
24-Feb	14	Photosynthesis	111 185-200 204-205
29-Feb	15	Plant Adaptations to Arid Environment	201-204
		Cell Communication Part I	210-218
2-Mar	16	Cell Communication Part II	218-229
		Reproduction of Cells: The Cell Cycle	235 241 242-248
7-Mar	17	Reproduction of Cells: Mitosis and Cytokinesis	232-242 254 328-329
9-Mar	18	Meiosis and Sexual Life Cycles	252-265
14-Mar	19	Mendelian Genetics	267-288 293 299-301

Broadcast Date	Session Number	Lecture Topics	10th Edition Text Pages
16-Mar	20	Beyond Mendel Part I	82 260-261 276-288 292-294
21-Mar		<b>SPRING BREAK</b>	
23-Mar		<b>SPRING BREAK</b>	
28-Mar	21	Beyond Mendel Part II	294-309
30-Mar	22	The Molecular Basis for Inheritance Part I	85 312-322 394-398
4-Apr	23	The Molecular Basis for Inheritance Part II	321-340
6-Apr	24	The Molecular Basis for Inheritance Part III	333-357 372
11-Apr	25	Control of Gene Expression	159 220 328-329 343 360-376
13-Apr	26	Regulation of Gene Expression during Embryonic Development Molecular Genetics of Viruses	668 376-383 392-406
18-Apr	27	Darwin's Evolutionary Paradigm	10 462-478 505 514 549
20-Apr	28	Darwin's Evolutionary Paradigm (continued) Microevolution: The Evolution of Populations	10 462-478 505 514 549 480-498
25-Apr	29	Microevolution: The Evolution of Populations (continued) The Origin of Species and Macroevolution	480-498 492 500-515 536-543 732
27-Apr	30	The Origin of Species and Macroevolution (continued) The History of Life	536-543 732 464 519-537 563-564
2-May	31	The Diversity of Life: Prokaryotes	11 97 241 321 563- 564 567-585



**Biology 171 Introduction to Biology I**  
**CRN 61116**  
**Spring 2016 Examination Schedule**

<b>EXAMINATION</b>	<b>TELEVISED SESSIONS COVERED</b>	<b>AVAILABILITY DATES*</b>
First Midterm	1 - 11	February 22 - 26
Second Midterm	12 - 21	April 4 - 8
Final Exam	Comprehensive Exam Emphasizes 22 – 31**	May 9 - 12

- \* The student needs to be aware of the operating hours of the campus testing center for these availability dates.
- \*\* Approximately 100 points of the Final Examination will be devoted to the last third of the class beginning with “The Molecular Basis for Inheritance” in televised session 22. Approximately 50 points will come content presented during the first two thirds of the class.

**BIOLOGY 171 - Introduction to Biology I**  
**Spring 2016 - CRN 61116**  
**Tentative Quiz Schedule**

Quiz Number	Topics Covered	Session Numbers	Quiz Start Date/Time	Quiz End Date/Time	Time Limit (min)	Comment
01	Science as a Way of Knowing Characteristics of Living Things	02-04 SUP01	1/20/16 5:00 PM	1/27/16 3:00 PM	20	SUP01 is Supplemental Podcast 01
02	The Chemistry of Life: Atoms and Molecules The Chemistry of Life: Properties of Water	SUP02 05	1/27/16 5:00 PM	2/3/16 3:00 PM	20	SUP02 is Supplemental Podcast 02
03	The Chemistry of Life: Biological Molecules	06-07	2/1/16 5:00 PM	2/8/16 3:00 PM	20	Quiz 03 availability begins before Quiz 02 availability ends.
04	The Structure and Function of Cellular Organelles Cell Membrane Transport Processes	08-09	2/8/16 5:00 PM	2/15/16 3:00 PM	20	
05	Energy and Life: Introduction to Cell Metabolism	10-11	2/15/16 5:00 PM	2/21/16 5:00 PM	20	Note that this quiz's availability ends on Sunday February 21 at 5:00 PM.
06	Cellular Respiration: Harvesting Cellular Respiration	12-13	2/29/16 5:00 PM	3/7/16 3:00 PM	20	In order to catch up on quizzes after the exam, Quizzes 06 and 07 will overlap each other in time
07	Photosynthesis Plant Adaptations to Arid Environments	14-15	2/29/16 5:00 PM	3/7/16 3:00 PM	20	
08	Cell Communication Reproduction of Cells	15-17	3/7/16 5:00 PM	3/14/16 3:00 PM	20	
09	Meiosis and Sexual Life Cycles Mendelian Genetics	18-19	3/14/16 5:00 PM	3/28/16 3:00 PM	30	The time limit for this quiz will be increased to 30 minutes for genetics problem-solving questions..
10	Mendelian Genetics Beyond Mendel	19-21	3/28/16 5:00 PM	4/3/16 5:00 PM	30	Provides more practice solving genetics problems. Note that this quiz's availability ends on Sunday April 3 at 5:00 PM.
11	The Molecular Basis for Inheritance	22-24	4/11/16 5:00 PM	4/18/16 3:00 PM	30	The time limit for this quiz will be increased to 30 minutes for molecular genetics problem-solving questions.
12	Control of Gene Expression Molecular Genetics of Viruses	25-26	4/18/16 5:00 PM	4/25/16 3:00 PM	20	
13	Charles Darwin's Evolutionary Paradigm Microevolution: The Evolution of Populations	27-29	4/25/16 5:00 PM	5/2/16 3:00 PM	30	There is a 30 minute time limit for this quiz.
14	The Origin of Species and Macroevolution The History of Life	29-30	4/27/16 5:00 PM	5/4/16 3:00 PM	20	Quiz 14 overlaps Quiz 13 in availability.
15	Prokaryotes	31	5/2/16 5:00 PM	5/8/16 5:00 PM	20	Note that this quiz's availability ends on Sunday May 8 at 5:00 PM. This quiz overlaps Quiz 14.