APPLICANT: G. Witteman

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COURSE ALPHA and NUMBER: BIO 171L

COURSE TITLE: Introductory Biology 1 Laboratory

ESTIMATED NUMBER OF SECTIONS:
Fall: 1
Spring: 1

APPLICATION IS FOR:
☐ New Course  ☐ Modified Course  X Existing Course  ☐ Re-designation
☐ Certification  X Re-Certification. Date of last certification:

DIVERSIFICATION AREA DESIGNATION SOUGHT:
☐ DA (Arts)  ☐ DP (Physical Sciences)
☐ DB (Biological Sciences)  ☐ DS (Social Sciences)
☐ DH (Humanities)  ☒ DY (Laboratory)
☐ DL (Literature and Language)

What percentage of the CONTENT of this course focuses on this diversification area? 100

What percentage of CLASS MEETINGS focuses on this diversification area? 100
1. **Hallmarks and SLOs.** Please explain how course-specific SLOs align with the diversification area’s hallmarks.

Biology 171L laboratory course student learning outcome alignment with diversification hallmarks (DY1-3) is shown here. Note that most of the SLOs for this course address multiple diversification areas directly. As the first semester laboratory of a two semester introductory biology course series for biology and science majors 100% of the course content for these courses (171, 171L, 172, 172L) use terminology of the biological sciences to describe knowledge and theories of the biological sciences and stresses that the ONLY way that biological sciences progress as disciplines are through application of the scientific method. All of the Biology topics explored in the biology labs are derived from biology topics presented in lecture for both 171L and 172L courses. The labs utilize biological science methods to measure and explore biological science topics. Because of this, all of these courses in this biology series exceed the 2/3 requirement to qualify as biology “diversification” courses. This course series provides the foundation concepts necessary for students further study of biological organism or processes at the molecular through ecosystem level of organization. These courses are a required for Associates and Bachelor of Sciences degrees in Biology at all of the University of Hawaii campuses.

**Laboratory Student Learning Outcomes**

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

1. Use the scientific method of inquiry to investigate biological phenomena.
2. Apply the concepts learned in BIOL 171 in an experimental and hands-on observational setting.
3. Collect, record, reduce, and interpret biological data.
4. Prepare written objective reports describing and interpreting experimental and observational results.
5. Demonstrate the use of some of the standard tools of the biological scientist, such as microscopes, scales, spectrophotometers, computers, and other analytical tools.
6. 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).

**DY.1** uses the laboratory methods of the biological sciences. The course SLO’s addressing this area are:

1. Use the scientific method of inquiry to investigate biological phenomena.
2. Apply the concepts learned in BIOL 171 in an experimental and hands-on observational setting.
3. Demonstrate the use of some of the standard tools of the biological scientist, such as microscopes, scales, spectrophotometers, computers, and other analytical tools.

**DY.2** involves processes and issues of design, testing, and measurement in the biological sciences;

3. Collect, record, reduce, and interpret biological data.
4. Prepare written objective reports describing and interpreting experimental and observational results.
5. 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).

**DY.3** demonstrates the strengths and limitations of the scientific method.

All, especially: 1. Use the scientific method of inquiry to investigate biological phenomena.
2. **Assessment strategies.** Explain assessment strategies you have used (or plan to use) to measure the degree to which students exit the course with the course-specific SLOs. If there are multiple sections of the course taught by different instructors, please discuss how assessment is (or will be) carried out across instructors.

| Laboratory exams, active participation in lab activities, and results reflected in students' laboratory journals are used to assess coverage of course SLOs. Completed laboratory activities appearing in student laboratory journals/notebooks are used to assess all student learning outcomes (1-6). In conducting experiments and activities, their ability demonstrates SLO: 3-5. Laboratory practical exams are particularly useful in assessing SLO: 3 and 6. |

3. **Assessment of assessment.** How have you used (or plan to use) the assessment findings to modify or improve this course? If there are multiple sections of the course taught by different instructors, please discuss how review of assessment results is (or will be) carried out across instructors.

| Instructors are provided with material and asked to follow the coverage and emphasis of topics in the U.H. system outline for this course. As the foundation for their degrees in biological sciences, and articulated/numbered/transferred between all campuses, every effort is made to insure that each topic is covered in appropriate detail (externally determined for consistency between all campuses). Every time the course is completed (after the semester) faculty will now be asked to assess their outcomes and compare to results to previous semesters. This assessment will be reviewed by permanent faculty and a summary will be put in the course/instructor materials for subsequent semesters if any changes and/or modifications to the course are necessary. |
DIVERSIFICATION BOARD DECISION:

☐ Approved
   Re-Certification Due: Spring 2018

☐ Not approved
   If not approved, reasons for disapproval:

Diversification Board Chair Signature: [Signature]
Date: 2/8/18
Biology 171/171L: Biology I

Instructor: Dr. Greg Witteman  
Class Times: MW. 1300-1415 , Lab: TH 1300-1550  
Classroom: 5-105  
Office hours: M-F(9-10)

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COURSE DESCRIPTION: Introductory biology for all life science majors. Cell structure and chemistry; growth, reproduction, genetics, evolution, viruses, bacteria, and simple eukaryotes. (3 hrs. lect., 1 hr. Lab).

While there are no prerequisites for this section of BIOL 171, there are recommended preparations: 1) High school chemistry or college chemistry (e.g., CHEM 151). 2) The student is strongly urged to take BIOL 171L, CHEM 161, & CHEM 161L concurrently as delays in taking these classes may delay the student’s ability to register for higher-level biology classes in a timely fashion. Taking 171 without the corresponding lab is strongly discouraged, and 171L without prior completion or current enrollment in the lecture course is not allowed.

Text:

Course Topics (Presented in both Lecture and Laboratory Sessions)
(The specific calendar of reading assignments and exam dates will be given in the first week of class)
1. The philosophy and characteristics of science and the scientific method;
2. The difference between hypotheses, theories and laws in science;
3. The definition of life and how living things differ from inanimate objects;
4. How living things are classified and named; the characteristics used to classify living things;
5. The chemical architecture of living things and the functions of the major groups of biological molecules;
6. The parts, their structures and functions, of cells and how prokaryotic cells differ from eukaryotic cells;
7. Cell metabolism including specific anabolic and catabolic processes;
8. Cell growth and division processes, mitosis and meiosis;
9. How genetic information is passed from parents to offspring and how this genetic information is expressed by cells;
10. Evolution as the unifying principle of biological science; and the evidence supporting evolution and natural selection.
11. The characteristics and biology of viruses, prokaryotes, protists, and fungi.

Additional Learning Resources:
In addition to the text and your lecture notes, I will make a variety of supplemental materials available through the course website and on the classroom's workstations. This will include practice quizzes, lecture outlines, concept and keyword lists, images of specimens and lecture summaries. You will also be able to check your exam, quiz and overall grades for the course through the website.

Methods of Evaluation:
As the course material is the same in lecture and lab, you will receive the same letter grade for both. The Lecture is weighted as ¾ of the overall grade (75%) and the lab counts for ¼ (25%) of your grade. Your final grade will be based on the total number of points that you receive out of a possible 400 points. If your are only taking the lecture or lab portions of the class you will be graded accordingly (As students attempting to take only one of the courses have had poor outcomes, it is strongly recommended to take both lecture and lab concurrently at HCC).

For the lecture’s 300 course points there will be 3 lecture exams worth 75 points (225 points total) and 5 lecture quizzes or assignments worth 15 points (75 points total). For the 100 points possible in lab, there will be three lab practical examinations worth 25 points each (75 points total) and 5 lab quizzes or exercises worth 5 points each (25 points total).

Full-credit makeup exams will only be given for documented illness or accident (i.e.: you must have a doctor’s excuse or a
copy of an official document such as a police report). If you miss an examination for any other reason you must complete the makeup exam within a week and you will only be able to earn a maximum of 70% of the points. Makeup quizzes for unexcused absences will only be worth 10 points maximum (50%). If you score less than a passing grade or are absent for any quiz, exam, or exercise YOU MUST COMPLETE A MAKEUP QUIZ OR ASSIGNMENT WITH A PASSING GRADE TO RECEIVE A FINAL GRADE FOR THE COURSE. There is no extra credit of any kind.

WITHDRAWAL ("W" grade): If you decide to withdraw from the course, the paperwork must be completed by the LAST DAY FOR ALL WITHDRAWALS, which can be found on the calendar in the schedule of courses. I will sign withdrawals only in cases of extreme or unusual circumstances. Grade-related excuses are unacceptable. If you simply disappear without withdrawing, you will receive an F for the course. Withdrawals after the designated time will be allowed by the college only in cases of extreme circumstances. Examples are a certified medical reason or a death in the immediate family.

INCOMPLETE ("I" grade): A "Request for Incomplete" form must be presented prior to the last day of instruction. An "I" grade will only be given to students who are achieving passing grades and who are very close to completing the course. In addition, a student must have a very good reason for not being able to complete the work or test on time. Good reasons are the same as those cited in the withdrawal policy above.

**Points needed for letter grades:**

- 360-400 = A = 90-100%
- 320-359 = B = 80-89%
- 280-319 = C = 70-79%
- 240-279 = D = 60-69%
- 0-239 = F = <60%

**Lecture Learning Objectives Corresponding to Course Topics:**

Upon successfully completing the course the student will be able to:

1. Explain the process and philosophical basis of scientific inquiry; clearly state how discovery and progress occurs in all natural sciences.
2. Distinguish between living things and inanimate objects.
3. Describe the classification of living things, the kinds of criteria used to classify them, and the formal protocol in naming them.
4. Describe the chemical architecture of living things and the functions of the major groups of biological molecules.
5. Describe the parts, their structure and functions, of cells, diversity of cell types, cell metabolism, cell communication, and cell division processes (mitosis and meiosis).
6. Solve problems in Mendelian genetics.
7. Describe the processes whereby genes are expressed as the characteristics of the whole organism.
8. Describe evolution as the unifying principle of biological science; and present the evidence supporting evolution and natural selection.
9. Discuss current hypotheses/theories regarding the evolutionary process and the origins of life, eukaryotic cells, sexuality, and multicellularity.
10. Describe the characteristics, systematics, and biology of viruses, prokaryotes, protists, and fungi.

**Laboratory Learning Objectives Corresponding to Course Topics:**

1. Demonstrate approved techniques of handling laboratory specimens and equipment;
2. Record data accurately and in proper form;
3. Identify and recognize the characteristics of various taxonomic groups of plants and animals;
4. Describe the structural features of selected bacteria, protists, plants and animals;
5. Identify and explain physiologically important features and functions of the organisms studied;
6. Explain the dynamics and interactions in natural populations;
7. Describe and give examples of the physical, chemical, and biological features of selected habitats/ecosystems.