Honolulu Community College
General Education – DIVERSIFICATION DESIGNATION
Certification and Recertification
Application Form
Spring 2012

APPLICANT: Dr. K. Gopalakrishnan

E-MAIL: gopalakr@hawaii.edu

COURSE ALPHA and NUMBER: BOT 101-L

COURSE TITLE: General Botany Laboratory

ESTIMATED NUMBER OF SECTIONS:
 Fall: 1
 Spring: 1

APPLICATION IS FOR:
☐ New Course ☐ Modified Course ☑ Existing Course ☐ Re-designation

☐ Certification ☑ Re-Certification. Date of last certification:

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

What percentage of the CONTENT of this course focuses on this diversification area? 95

What percentage of CLASS MEETINGS focuses on this diversification area? 95
1. **Hallmarks and SLOs.** Please explain how course-specific SLOs align with the diversification area’s hallmarks.

**DY. 1 Uses the laboratory methods of the biological sciences:**

SLO1. Perform experiments on living plant, collect, analyze data and write a report in scientific format.
SLO 2. Identify significant parts and variations of plant cells, roots, stem, leaf, flower and fruit.
SLO 3. Demonstrate ability to use laboratory equipment and procedures effectively for observation and data gathering
SLO 4. Identify plants from fresh materials to their scientific designation
SLO 5 perform experiments including significant physiological processes in plants and analyze the outcomes

SLO 1 and SLO 3 introduce students into laboratory methods in biological sciences. Laboratory sessions will train students to do hand sectioning and biological staining of leaves, roots and stems (SLO 2). Students will learn to use compound and dissecting microscopes to study plant cells and cell division (mitosis) (SLO 3). Students are required to identify plant species from direct observation on fresh plant materials so that they will learn basics of plant classification (SLO 4). Audio-visual materials demonstrating life cycles of fern and limu and fieldtrip activities will strengthen student’s understanding of life of plants and their patterns of distribution. Students will set-up experiments to observe and study biological and physiological process in plants such as seed germination, photosynthesis and growth rates under different light conditions (SLO 5).

**DY 2. Involves processes and issues of design, testing and measurement:**

SLO 1. Perform experiments on living plant, collect, analyze data and write a report in scientific format.
SLO 5 perform experiments including significant physiological processes in plants and analyze the outcomes

SLO 6. Learn basics of diversified farming techniques

SLO 1 and SLO 6 involve issues of design, testing and measurements. Instructor will guide students in the lab to design experiments to measure various biological processes such as photosynthesis and plant growth under various environmental conditions (SLO 5). Students will be able to use the greenhouse facility on campus to design live experiments to tests and take measurements biological processes taking place in plants (SLO 1). The greenhouse facility will also enable students to set up small-scale farming to get practical knowledge of diversified crop production techniques (SLO 6).
DY 3. Demonstrates the strengths and limitations of the scientific method:

SLO 1. Perform experiments on living plant, collect, analyze data and write a report in scientific format.
SLO 3. Demonstrate ability to use laboratory equipment and procedures effectively for Observation and data gathering
SLO 5 perform experiments including significant physiological processes in plants and analyze the outcomes

Students are aware of the limitations of laboratory experimental set-ups aimed at understanding the biological and physiological processes taking place in plants (SLO 1, SLO 3 and SLO 5). These limitations are documented during fieldtrip activities as they observe plants in the wild. Technological advancements and availability of modern instruments to conduct laboratory experiments have helped to achieve precision in scientific measurements. Lab sessions are usually for about three hours per week and therefore, students realize the limitations in their data gathering and interpretation of the results (SLO 1 and SLO 5). However, they learn about basis of experimental design and data collection procedures in the lab.

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 (DY) component is designed to complement lecture and strengthen students understanding of biological processes. Attendance during lab sessions and field trip is monitored to ensure student participation. Laboratory reports that the students submit is a measure of the effectiveness to which students exit the course with the course-specific SLOs. Effectiveness of the field trip in meeting the course-specific SLOs are also discussed and reviewed in the class and student suggestions are incorporated to make future fieldtrips even more efficient. Positive feedback received from students show that they understand how well the laboratory activities enhanced their knowledge of the life of plants in general. Students provide positive feedback in their evaluations of the course and instructor. Grades are calculated based on points accumulated in lab practicals (midterm and final), laboratory reports and student participation (attendance, group activities and discussion). There are no multiple sections for this course. At present, a lecturer is hired to teach this course.
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.

| This laboratory course has been upgraded recently to incorporate advancements made in cytology and genetics. Support from extramural grant has enabled to procure laboratory tools and instruments to provide effective lab sessions | Assessment strategies (student comments, exams and laboratory reports) for this course were reviewed and modified to incorporate new approaches to the study of plant life and also to respond to feedback received from students. Laboratory is equipped with new microscopes and dissecting tools to facilitate effective lab sessions. Based on student’s interest to receive experiential education, laboratory sessions have included outdoor experimental activities at the greenhouse on campus. |
DIVERSIFICATION BOARD DECISION:

☑ Approved
Re-Certification Due: Fall 2017

☐ Not approved
If not approved, reasons for disapproval:

Diversification Board Chair Signature: ____________________________
Date: 9/18/12
Course Syllabus

Course Title: General Botany Laboratory

Course Number: BOT 101 L

Credits: 1

Prerequisite: None

Co requisite: Concurrent registration in BOT 101 (General Botany)

Time: 11:30 -2:30 PM (Th)

Course Description:

Lab sessions will involve specific application of lecture material. Laboratory observations, experiments and field trips will illustrate the basic principles of plant biology, introduction to diverse farming technologies in increasing food production and impact of environmental pollution on plant biology.

Course Content: (see attached)

Laboratory exercises on plant structure and identification, physiology (photosynthesis, respiration, reproduction and transportation), macro-algae life cycles, plant propagation, fleshy fruits and seeds, soil and water chemistry.

This course will satisfy the diversification requirement in Biological Sciences (DY) (Group 1 of Natural Science).

Student learning outcomes:

1. Perform an experiment on living plants, collect, analyze data and write a report in scientific format.
2. Identify significant parts and variations of plant cells, root, stem, leaf, flower and fruit.
3. Demonstrate ability to use laboratory equipment and procedures effectively for observation and data gathering.
4. Identify plants from fresh materials to their scientific designation.
5. Perform experiments including significant physiological processes in plants and analyze the outcomes.

Required Text:

Grading Procedure:
Grades are calculated based on the number of points achieved. Points are accumulated in the following areas:
- Lab Practical (Midterm and Final): 100 points each
- Laboratory Report (1): 50 points
- Participation (attendance, group activities, discussion): 50 points

Final Grade Calculation:
- 90% points or more  A
- 80% points – 89% points  B
- 70% points – 79% points  C
- 60% points – 69% points  D
- Less than 60%  F

There are no make-ups for any part of this class. Late work will not be accepted. An excuse for not taking the exam on time or late submission of work will be given only for health-related reasons and will require written documentation from your physician.

Attendance Policy:
Due to the nature of this course, attendance is mandatory for complete understanding of the materials. Consideration may be given to the student for the attendance, participation in the class discussions and student group activities throughout the course when calculating the final grade.

Students with disabilities may obtain information on available services online at http://honolulu.hawaii.edu/disability. Specific inquiries may be made by contacting Student ACCESS at (808) 844-2392 voice/text, e-mail at access@hcc.hawaii.edu, or simply stopping by Student ACCESS located in Bldg. 7, Rm. 319.
<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Site</th>
<th>Student Work</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Scientific Method; Seed Germination; Scientific Writing</td>
<td>HCC Lab</td>
<td>Lab Report (due after 2 weeks of data collection)</td>
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<td>Microscopes: Compound light and dissecting scopes and identification of biological compounds</td>
<td>HCC Lab</td>
<td>Gather data and report results in a table, turn in at end of lab</td>
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<td>Plant cells and organelles (<em>Eiodea</em>); mitosis (prepared slides of onion root tips)</td>
<td>HCC Lab</td>
<td>Turn in drawings at end of lab</td>
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<td>Roots and Stems: hand sectioning and biological staining techniques</td>
<td>HCC Lab</td>
<td>Turn in drawings at end of lab</td>
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<td></td>
<td>Leaves: epidermal features, hand sectioning and biological staining techniques</td>
<td>HCC Lab</td>
<td>Turn in drawings at end of lab</td>
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<td>Plant nutrients, water quality and Bioremediation</td>
<td>HCC Wet lab</td>
<td>Gather water quality test data and report results in a table, turn in at end of lab</td>
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<td>Lab Practical</td>
<td>HCC</td>
<td>Practical exam using plant samples and questions based on lab experiments</td>
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<td>Photosynthesis</td>
<td>HCC – courtyard container gardens</td>
<td>Observe plants grown under differing light conditions, answer questions and turn in at end of lab</td>
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<td>Botanical Bioassay</td>
<td>HCC Lab</td>
<td>Perform simple water extractions and test for efficacy and toxicity using brine shrimp bioassay; report results in a table and turn in at end of lab</td>
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<td>Macro algae; limu life cycles</td>
<td>HCC Lab</td>
<td>Observe limu specimens- turn in drawings at end of lab</td>
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<td>Flowers and fruits</td>
<td>HCC Lab</td>
<td>Observe and identify flower and fruit anatomy, turn in labeled drawings at end of lab</td>
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<td>Fern Life cycles</td>
<td>HCC Lab</td>
<td>Observe specimens and watch video</td>
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<td>Fungi</td>
<td>HCC Lab</td>
<td>Observe and sketch prepared slides</td>
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<td>Lyon Arboretum Foster Botanical Gardens and Queen Liliuokalani Gardens</td>
<td>Turn in answers to worksheet at the end of field trip Turn in answers to worksheet at the end of field trip</td>
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<td>Final Lab Exam</td>
<td>HCC</td>
<td>Practical exam using plant samples and questions based on lab experiments and field trips</td>
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8-27-2012