APPLICANT: Dr. K. Gopalakrishnan

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COURSE ALPHA and NUMBER: ZOO 200

COURSE TITLE: Marine Biology

ESTIMATED NUMBER OF SECTIONS:
  Fall: 1
  Spring: 1

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

DIVERSIFICATION AREA DESIGNATION SOUGHT:
  □ DA (Arts)  □ DP (Physical Sciences)
  X 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.

**DB. 1 Uses the terminology of the biological or physical sciences:**

- SLO 1. Application of ecological concepts
- SLO 6. Examine taxonomic and spatial classification systems
- SLO 7. Introduce morphological features of marine organisms (corals, fish, shrimps, whales, seaweeds etc...)

Learning terminology and vocabularies used in biological sciences is a key-stone in understanding concepts discussed in biology classes. These are included in SLO 1, 6 and 7. Community structure and food-chain dynamics are included in SLO 1. Terminology used in classification of marine organisms are explained in SLO 6. To understand adaptations of marine organism for life in the ocean, morphological features need to be addressed and it takes up a major part of SLO 7.

**DB. 2. Involves knowledge and theories relating to processes in the biological sciences:**

- SLO 2. Understand behavioral and adaptation aspects of reef organisms including edible fish and seaweeds
- SLO 3. Learn about world fisheries, aquaculture and marine pollution
- SLO 5. Evaluate the influence of biotic and abiotic factors on the distribution and abundance of marine organisms

Organisms adapt to withstand the demand imposed by environmental factors of the ocean. These topics are discussed in SLO 2 and 5. Understanding the ocean’s role in providing food is a major part of marine studies and this topic is included in SLO 3.

**DB. 3. Demonstrates inquiry that is guided by observation/experiment and reasoning and Mathematics:**

- SLO 1. Application of ecological concepts
- SLO 3. Learn about world fisheries, aquaculture and marine pollution
- SLO 4. Marine data collection and analysis
- SLO 7. Introduce morphological features of marine organisms (corals, fish, shrimps, whales, seaweeds etc...)

Understanding of ecological concepts (SLO 1) is essential for students to learn about fisheries, aquaculture and impacts of pollution on marine life (SLO 3). Through field trip activities and laboratory exercise, students learn about data collection, analysis and interpretation (SLO 4) which will improve their critical thinking and reasoning abilities.
DY 1. Uses the laboratory methods of the biological sciences:

- SLO 1. Application of ecological concepts
- SLO 2. Understand behavioral and adaptation aspects of reef organisms including edible fish and seaweeds
- SLO 3. Learn about world fisheries, aquaculture and marine pollution
- SLO 4. Marine data collection and analysis
- SLO 5. Evaluate the influence of biotic and abiotic factors on the distribution and abundance of marine organisms
- SLO 6. Examine taxonomic and spatial classification systems
- SLO 7. Introduce morphological features of marine organisms (corals, fish, shrimps, whales, seaweeds etc...)

Laboratory sessions will introduce students to SLO 1, SLO 2, SLO 6 and SLO 7. Field trip activities are designed to facilitate data collection and analysis (SLO 4) and provide insight into impact of pollution on marine life (SLO 3).

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

- SLO 1 and SLO 4 introduce students into experimental design, data collection, and measurement. Hydrographical data collection and analysis are integral part of marine ecological studies. Laboratory examination of various marine organisms are designed to make students understand how these organisms are adapted to survive (effective feeding strategies while avoiding being eaten and successful reproductive strategies for ensuring the species existence) (SLO 2). Microscopic sorting, enumeration, length measurements and dissection procedures of planktonic organisms enhance students eye-hand coordination in handling and studying microorganisms. pH, oxygen, salinity and temperature measurements are part of laboratory exercises (SLO 4). Preparation of a laboratory report enable students to carry out independent literature search to design and prepare their final reports.

DY 3. Demonstrates the strengths and limitations of the scientific method:

Introduce students to limitations involved in data collection from a multi-dimensional marine environment (east-west, north-south and vertical dimensions) (SLO 4). These limitations are documented during field-trip activities. However, advancements made in marine data collection has overcome some of these limitations. Technological advancements have helped to achieve precision in scientific measurements. Both biotic and abiotic factors (SLO 5) influence the distribution and abundance of marine organisms. Therefore, knowledge of these factors help us estimate the production potential of biological resources of the ocean.
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 integrated into ZOO 200 course. Laboratory requirements are divided into two components: participation in all lab exercises, experiments and field trips; and submission of a final lab report on marine organisms examined in the lab. Attendance during lab sessions and field trip is monitored to ensure student participation in laboratory exercises and experiments. Student participation in field trip is mandatory to ensure that they meet SLO 1, SLO 2, SLO 3, SLO 4 and SLO 7. Effectiveness of the field trip in accomplishing these SLOs are discussed and reviewed in the class and suggestions for any change in format of field trip activities are taken into consideration for incorporation into future. During observation of marine organisms in the lab, students are asked examine how well these organisms are adapted to accommodate in the physical environment, how well they are adapted to feed and avoid being eaten by others and how well they are adapted for successful reproduction for ensuring species survival. Positive feedback received from students show that they understand how well these laboratory activities enhanced their knowledge of marine life in general. Students provide positive feedback in their evaluations of the course as well as in the lab report they independently prepare. There are no multiple sections for this course. Only one professor is teaching 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.

Assessment strategies for this course were reviewed and modified many times over the years to incorporate new approaches to the study of marine life and to respond to feedback received from students. During the last twelve years, Professor wrote grants bringing extra-mural funds to make instructional improvements by using state-of-the-art technology in the classroom and to provide financial support for needy students. Improvements made in the laboratory enabled the professor to modify lab activities using better microscopes and dissecting tools. Addition of new instruments and audio-visual resources helped to enhance student-learning outcomes. For over fifteen years, professor had taught this course (summer sessions) for the Zoology department at the University of Hawaii at Manoa campus, which helped to establish course equivalency and articulation between the two campuses. Future assessment of assessment plans will also include incorporation of any viewpoints expressed by accreditation panel. At HCC, this course has been offered for over thirty-seven years. Whenever other instructors are hired to teach additional sections of this course, professor would meet with them to make sure that all sections of the course are congruent with same SLOS. At present, only one professor is teaching this course.
DIVERSIFICATION BOARD DECISION:

☑ Approved

Re-Certification Due: 5/2017

☐ Not approved

If not approved, reasons for disapproval:

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Diversification Board Chair Signature: _______________________________

Date: 2-4-2017
Course outline

Course: ZOO 200 (Marine Biology) (DB+DY)

Professor: Dr. K. Gopal (Ph.D in Oceanography, Scripps Institution of Oceanography, University of California)

Credits: 3

A. Course Description:

Lectures in this course provide an introduction to the marine flora and fauna, including those of the Hawaiian waters. Knowledge of the physical, biological and ecological characteristics of the marine environment is important for understanding the life systems of the oceans. This course will cover coral reef organisms, deep sea life, fisheries, farming the ocean, marine resources and the effects of pollution on marine life.

B. Hours per week: 5 hrs per week (2 hrs lecture & 3 hrs lab).

C. Pre-requisite: None
   Co-requisite: Participation in field-trip activities

D. Specific Course objectives and SLOS (Student Learning Outcomes):

This course will satisfy the diversification requirement in Biological Sciences (DB+DY) (Group 1 of Natural Science). It is an informative course for residents of our island state.

SLOS include:
1. Application of ecological concepts
2. Understand behavioral and adaptation aspects of reef organisms including edible fish and seaweeds
3. Learn about world fisheries, aquaculture and marine pollution
4. Marine data collection and analysis
5. Evaluate the influence of biotic and abiotic factors on the distribution and abundance of marine organisms
6. Examine taxonomic and spatial classification systems
7. Introduce morphological features of marine organisms (corals, fish, shrimps, whales, seaweeds etc...)

F. Evaluation and Grades:

Letter grades are determined on the basis of your performance in four exams: three written and one lab exams. As part of the lab exam, students are required to submit a lab report on the day of lab exam. Letter grades are assigned using the following break-down of student’s average score for the Four exams: 90%-100% = A; 75%-89% = B; 60%-74% = C; 50%-59% = D and <40% = F.

If a student misses any exams, the score for that exam will be zero. Therefore, it is the responsibility of students to take the exams on scheduled date and time. Excuse for not taking an exam on the scheduled time will be given only for compelling reasons and will require written documentation such as a letter form your physician.

Updated: March 23, 2012