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

APPLICANT: Dr. K. Gopalakrishnan

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COURSE ALPHA and NUMBER: OCN 201

COURSE TITLE: Science of the sea

ESTIMATED NUMBER OF SECTIONS:
Fall: 3
Spring: 2

APPLICATION IS FOR:
■ New Course ■ Modified Course ■ Existing Course ■ Re-designation
■ Certification X Re-Certification. Date of last certification: 2011

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

What percentage of the CONTENT of this course focuses on this diversification area? 80

What percentage of CLASS MEETINGS focuses on this diversification area? 80
1. **Hallmarks and SLOs.** Please explain how course-specific SLOs align with the diversification area's hallmarks.

DP. 1 Uses the terminology of the physical sciences:

SLO 1. Application of metric units of measurement in ocean studies

SLO 3. Examination of ocean's potential in providing food and alternate energy

SLO 4. Learn about principles of radiometric dating in determining the age of ocean basin

SLO 5. Familiarize with plate tectonics, continental drift and sea-floor spreading theories

Because of the inter-disciplinary nature of the course, it is critical that students are introduced to the terms and vocabulary of physical sciences used in the study of the ocean. Since measurements of various processes of the ocean are done using metric system, students have to familiarize with these units and their conversions (SLO 1). For students to understand the application of modern technologies to harness the ocean's resources, it is important that they have knowledge of basic principles of geology, chemistry and physics (SLO 3 & 4). Students need to know vocabularies and terms of geology chemistry and physics to understand geographic coordinates, plate tectonics and sea-floor spreading processes (SLO 2 & 5)

DP 2. Involves knowledge and theories relating to processes in the physical science:

More than two-thirds of this course deals with the geological, chemical and physical aspects of the ocean and examines how these processes are inter-related and how they collectively influence life in the sea. Knowledge of the physical characteristics of the earth's interior is important for students to understand sea-floor spreading and continental drift theories (SLO 5). Application of radiometric methods is essential to determine age of rocks underlying the ocean basins (SLO 4). Mathematical concepts are to be used for introducing students to coordinate systems (Latitudes and Longitude) and methods of their determinations (SLO 2). Knowledge of light, heat and fundamentals of energy transfer is essential in order to introduce students to the potential of oceans for alternate energy (thermal gradient, waves, tides and currents) (SLO 3)

DP 3 Demonstrates inquiry that involves observation/experiment and reasoning and mathematics.

Experimental design, data collection, analysis and interpretation of the data to reach conclusions are systematic steps used in any scientific study. Through visual observation, experimental procedures and application of concepts in mathematics, students receive many opportunities to improve their critical thinking ability and expand their knowledge of physical nature and dynamism of our planet earth, two-thirds of which is under the ocean. Depletion of ocean's food resources, impact of ocean pollution, global warming and sea-level rise are alarming issues facing humanity and students in this class carry out discussions on these topics and through reasoning emerge with new ideas to save planet earth. Through mathematical or computer models, they envision solutions to these problems are possible if appropriate actions are taken.
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.

Students are encouraged to attend lecture sessions, procure the prescribed textbook, take the exams on time so that they can meet the course specific SLOS and the professor can then measure the effectiveness of the activities in the class in meeting those SLOS. Most part of the exams comes from materials covered and discussed in the class and a major part of the topics covered in the lecture comes from the prescribed textbook. Using visual presenter, professor provides ample time for students to prepare their own notes. Questions in the exams are direct measure of the effectiveness of course-specific SLOS. Post-evaluation of student performance in the exam is a good measure of course-specific SLOS. Students get a chance to evaluate their performance in the exams afterwards, thus providing a chance to learn about the mistakes they made while answering the questions. Positive feedback from student evaluations regarding the mode of instruction and format of exams are good measures of meeting the SLOS. Professor uses similar instructional methods in multiple sections of this course. Whenever instructors are hired to teach additional sections of this course, efforts are made to ensure that they also meet course-specific SLOS.

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 have been reviewed and modified many times over the years to reflect the dynamic and evolving nature of the contents of this course and to incorporate feedback from student evaluations. For over fifteen years, professor had taught this course (summer sessions) for oceanography department at the University of Hawaii at Manoa campus, which helped to establish equivalency in competency for course articulation between the two campuses. Future assessment of assessment plans will incorporate any viewpoints expressed by accreditation panel. At HCC, this course has been offered for over thirty-seven years. 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. Course improvements were possible by adding oceanographic instruments, new audio-visual resources and upgrading of the classroom/lab facilities, all of which helped to enhance student-learning outcomes. 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.
DIVERSIFICATION BOARD DECISION:

☑ Approved
Re-Certification Due:  Sp 2017

☐ Not approved
If not approved, reasons for disapproval:

[Signature]
Diversification Board Chair Signature:
Date: 24 Apr 2017
COURSE OUTLINE

Course: OCN 201 (Science of the sea) (DP)

Credits: 3

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

A. Course Description:

This course offers a descriptive and non-mathematical survey of geological, physical chemical and biological oceanography, providing the student with a broad understanding of the seafloor and its features; chemical properties of sea water and its motions; life in the sea and its interaction with the environment.

Course Content: Oceanography is the scientific study of the ocean and, for convenience, it is divided into the following four disciplines:

1. Geological Oceanography
2. Chemical Oceanography
3. Physical Oceanography
4. Biological Oceanography

Geological Oceanography and Geophysics deal with the study of ocean basins, their structures, features, and history of their formation. Study of sediment helps us to understand many events such as evolution of ocean basin, climatic and sea level changes and ocean life in the geological past. Study of sediments also provides information on the formation and distribution of many mineral resources of great economic value. Ocean floor studies in recent times have brought evidence to support a revolutionary idea that the surface of the earth consists of a series of large and small moving lithospheric plates which drift continents around, opening new oceans and closing old ones.

In Chemical Oceanography, we will examine the molecular structure and properties of water; along with factors controlling the chemical and physical properties of water. Lectures will also cover a section on the chemical composition of sea-salt and its determination. Importance of CO₂ – CO₃ cycle in the ocean will be discussed in light of problems associated with global warming.

Topics in Physical Oceanography will include distribution of light and heat; air-sea interactions, ocean currents, waves and tides. Studies on the distribution of hydrographic properties and its influence on ocean’s dynamic processes are integral part of this discipline.

Influence of geological, chemical and physical processes on the distribution and abundance of marine organisms will be discussed to understand ecological principles, food-chain concept and world fisheries.

B. Hours per week: 3 hrs per week
C. Pre-requisite: None
D. Specific Course objectives and SLOS (Student Learning Outcomes)

This course will satisfy the diversification requirement in Physical Sciences (DP) (Group 2 of Natural science). It is a pertinent course about oceans for the residents of our island state.
SLOS include:
1. Application of metric units in ocean studies
2. Understand the design and determination of geographical coordinates (Latitudes and Longitudes)
3. Examination of ocean’s potential in providing food and alternate energy
4. Learn about principles of radiometric dating in determining the age of ocean basin
5. Familiarize with plate tectonics, continental drift and sea-floor spreading theories


F. Evaluation and Grades:

Letter grades are determined on the basis of your performance in three exams: two mid-terms and one final. Letter grades are assigned using the following break-down of student’s average score for the three exams: 85%-100% = A; 75%-84% = 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