

Department of Public Health Sciences
Course # : PH781 (CRN 79474) (1 credit)
Course Title: Environmental Health Lab Methods
Semester & Year: Fall, 2008

Meeting Place: Biomedical Science Building D102

Meeting Time: Wednesday 2:00-4:00 pm

Instructor Information:

Name: Yuanan Lu

Phone: 956-2702

Fax: 956-5818

Email: ylu@pbrc.hawaii.edu

Office Hours: Monday 2-4 or by appointment

Course Description: This course will be a hands-on training course aimed at providing attendees with different laboratory skills commonly used for detecting and monitoring environmental pollutants, including pathogenic viruses. Brief lectures will be provided for each laboratory method regarding its principal and mechanism and lab method procedure will be introduced and discussed step-wise before each lab exercise. All experimental reagents and supplies will be pre-prepared and tested to ensure positive learning and successful lab completion. Lab handouts will be given to attendee the week before and students are encouraged to read them prior to coming to class. Attendees are required to turn in their experimental lab report after completion of each lab exercise and a brief discussion will follow regarding each lab method and the attendees' reports. Two lab exams will be given during the course of this lab method class.

Course Learning Objectives:

To know how to collect environmental samples for laboratory analysis

To know methods for isolation of genomic DNA from varied source of environmental specimens

To understand and apply molecular biology methods for environmental pollutant detection

To understand the principle and application of immunologic techniques

To know how to grow and maintain animal cell culture in vitro

To understand and apply cell cultures as a sensitive biological marker to monitor and detect environmental viral pathogens and toxic pollutants

To know how to analyze lab data and write data-based lab report

Learning Goals: At the end of the course, the students should have a basic understanding of different lab methods currently used in environmental pollution monitoring and detection. The student should know how these lab techniques are conducted and their sensitivities in monitoring environmental pollutants, and advantages and disadvantages for the use of these methods.

Text Materials: Handouts to be provided for each lab exercise

Course Policies:

- Students must attend class and participate in class discussions.
- There is no food and drinks allowed in this lab-method class

- Students should participate in conducting all the experimental tests
- Lab report must be received **when due** to be considered to receive full credits.
- There will be no extra credit given in class.

Course Grading: The final course grade will be based on total points the student has received from final exam, class attendance, paper presentation, and group discussion as detailed in the Table below.

Grading Points	Points
Class attendance/participation	10
Class discussion	10
Laboratory report	40
Lab Quiz 1 (Midterm)	20
Lab Quiz 2 (Final)	20
Total	100

Grading Scale: A+ = 97-100%, A = 93-96%, A- = 90-92%, B+ = 87-89%, B = 83-86%, B- = 80-82%
 C+ = 77-79%, C = 73-76%, C- = 70-72%, D+ = 67-69%, D = 63-66%, D- = 60-62%
 F = unacceptable work

PH 781 Schedule:

Date	No.	Lecture topic
Aug 27	1.	Course Introduction
Sept 3	2	Methods for experimental sample collection
Sept 10	3.	DNA extraction from experimental animal tissues (sea turtle specimen)
Sept 17	4	DNA isolation from in vitro animal cell cultures (fish cells)
Sept 24	5.	DNA quality and quantity, digestion and electrophoresis
Oct 1	6.	PCR detection of environmental pathogens
Oct 8	7.	Immunoassay to detect environmental pathogens (FITC)
Oct 15	8.	Immunoassay to detect toxic contaminants - ELISA
Oct 22	9.	Quiz #1 and Animal cell culture Principle and application
Oct 29	10.	Growth of Vero and EPC cells and cell enumeration
Nov 5	11.	Cell viability test (Trypan blue exclusion assay) and cell preservation
Nov 12	12.	Cell culture assay for viral detection and viral propagation
Nov 19	13.	Quantitative viral assay – TCID ₅₀ and plaque assays
Nov 26	14.	Cell culture assay for NaCl cytotoxicity assay – Coomassie Blue test
Dec 3	15.	Cell culture assay for NaCl cytotoxicity assay – MTT test
Dec 10	16.	Comparative sensitivity of different cell cultures to NaCl cytotoxicity
Dec 17	17.	Quiz #2 and lab wrap up – Question and Discussion

Competencies

As stated in the Student Handbook: “To ensure that students are able to integrate their classroom experiences with the realities of the practice of public health in the field, there are specific competencies to be achieved in the MPH degree program and within their specialization.”

By graduation, MPH students must demonstrate ability to apply public health perspectives, knowledge, and skill in the areas of cultural understanding, communication, policy development, program planning, critical analysis and public health practice. Since PH 781, Environmental Health Lab Methods is a hands-on training course for laboratory techniques and will be a core course for MPH degree in Environmental Health specialization to be established, a few of the competencies listed below will be addressed in this lab technique-based course while others are left for other courses covered in the degree program. The table below lists all the competencies and the ones that be addressed in Ph 781 are checked.

PH781-Environmental Health Lab Methods-Course's Competencies		
<i>Specialized Competencies</i>	To be addressed	Methods to Achieve Competencies
<ul style="list-style-type: none"> Define a public health problem (AS1). 	Yes	Lectures, class discussion and exams
<ul style="list-style-type: none"> 		
<ul style="list-style-type: none"> Identify public health practices for disease control including surveillance, screening and outbreak investigation (E2) 	Yes	Lectures, class discussion, laboratory exercises, and exams
<ul style="list-style-type: none"> Identify practices for disease detection including the use of biomarkers, and molecular biology (E3) 	Yes	Lectures, class discussion, laboratory exercise, and exams
<ul style="list-style-type: none"> 		
<i>MPH Competencies</i>		
<ul style="list-style-type: none"> 		
<ul style="list-style-type: none"> Work effectively in a team environment (CS1) 	Yes	Discussion, and lab exercise and report done by group or term
<ul style="list-style-type: none"> Collect and summarize data relevant to an issue (AS3) 	Yes	Lab report and discussion
<ul style="list-style-type: none"> 		
<ul style="list-style-type: none"> 		