UNIVERSITY of HAWAI'I MĀNOA

OFFICE OF PUBLIC HEALTH STUDIES
GRADUATE COURSE SYLLABUS

1. Course Information

- **a. Course Number and Title:** PH663 Principles of Epidemiology I
- **b. Credit Hours & Semester Offered**: 3 Credit Hours, Fall 2019
- **c. Meeting Day(s), Times & Room No.:** Wednesday, 09:00-11:50, Biomedical Sciences Building, Room T211
- **d. Prerequisite(s):** NA

2. Instructor Information

- **a. Name:** Al Katz, MD, MPH
- **b. Phone:** 956-5741
- **c. Email:** katz@hawaii.edu
- **d. Office Location:** Biomedical Sciences Building, Room D104M
- **e. Office Hours:** By Appointment

3. Course Description

This is a survey course to introduce students to epidemiologic principles and methods. Topics covered include: outbreak investigation, measures of morbidity and mortality, vital statistics, incidence and prevalence measurements, adjustment of rates, measurements of risk, biological variability, screening, measurements of error, sampling, statistical significance, surveillance, study design, and association and causation.

The course material will be presented mostly in lecture format. Assigned readings to prepare for the weekly lecture are listed in the "tentative course schedule." The single required textbook is: A Study Guide to Epidemiology and Biostatistics, 7th edition, by JR Hebel and RJ McCarter. It may be purchased from the main campus bookstore in Campus Center. Used copies may be available from students who have already taken the class. Copies of previous editions are on reserve in the Wong Audiovisual Room, Sinclair Library. Several exercises will also be assigned. Exercises can be found on the Laulima website. Exercises will be discussed in class on assigned dates. Students are expected to come to class prepared to discuss the exercises and their answers to the questions in the exercises. Video presentations may be made during the course to demonstrate the application of epidemiologic topics.

4. Learning Objectives for the Course

Upon completion of the course, the student will be able to:

1. Define epidemiology and identify applications of the epidemiologic method.
2. Identify examples of primary, secondary, and tertiary prevention.
3. Describe the contribution of epidemiology to disease prevention and control.
4. Name several sources of population and disease information and identify the major errors inherent in them.
5. Define and interpret the following terms: validity, reliability, sensitivity, specificity, positive predictive value.
6. Name, apply, calculate and interpret commonly used public health rates.
7. Explain the need for rate adjustment; interpret adjusted rates.

8. Given a summary description of an analytic study:
   A. Select terms to describe the study design.
   B. Name and calculate appropriate rates, proportions, and measures of risk.
   C. Interpret the study results.
   D. Identify strengths, limitations, and potential sources of bias.
9. Identify three basic epidemiologic study designs and list the strengths and weaknesses in each.
10. Define information bias, selection bias, and confounding and give examples of each.
11. Given a causal hypothesis for a described health problem, select the most appropriate analytic study design to test the hypothesis.
12. Given disease frequency data in graphic or tabular form, interpret the findings and identify trends and patterns in disease occurrence.
13. Interpret trends and patterns in disease occurrence in terms of public health implications.
14. Correctly define and apply the basic vocabularies of infectious and chronic disease epidemiology.
15. Given data from a study of disease etiology, select the most plausible interpretation among several alternatives.
16. List and describe the criteria used to assess whether a statistically significant association between an independent and dependent variable is causal.
17. Differentiate causal, indirect, and artifactual associations, and give examples of each.

5. Course Schedule & Assignments

Tentative Course Schedule				
Week number (date)	Hour 1 (9:00-10:15)	Hour 2 (10:30-11:50)	Competencies	Activity
1 (8/28)	Introduction	Film: Plagues		
2 (9/04)	Lec: Investigation of an Epidemic (Chap. 1)*	Ex 1: Snow and Cholera	MPH 1 & 4	In class exercise in which students are asked to: identify outbreak investigation methods; interpret epidemic curves and exposure-specific attack rate data
3 (9/11)	Lec: Vital Statistics/Measures of Mortality/Incidence & Prevalence (Chap. 2,3)*	Ex 2: Rates and Adjustments (Parts A and B)	MPH 1,3, & 4	In class exercise in which students are asked to: calculate cumulative incidence and prevalence; interpret cases and rates for infectious diseases
4 (9/18)	Ex 2: Rates & Adjustments (Part C: Direct Method Only)		MPH 1, 3, & 4	In class exercise in which students are asked to: calculate obesity-adjusted hypertension prevalence proportions and interpret results of crude and adjusted measures.
5 (9/25)	Midterm 1		MPH 1, 3, & 4 EPI 1 & 4 MSE 1	Midterm examination in which students are asked to: calculate and interpret food-specific attack rates; calculate factor specific mortality rates; calculate incidence, prevalence, proportionate mortality ratios; interpret crude and age-adjusted cancer mortality rates
6 (10/02)	Lec: Measurements of Risk (Chap. 4)*	Lec: Biological Variability (Chap. 5)*		

7 (10/9)	Lec: Screening (Chap. 7)*	EX 3: Measurements of Error	MPH 1, 3, & 4	In class exercise in which students are asked to: calculate and interpret sensitivity, specificity, and positive predictive value for anemia screening; interpret results of data analysis from screening programs
8 (10/16)	Lec: Sampling (Chap. 8)*	Lec: Statistical Significance (Chap. 9)*		
9 (10/23)	Lec: Surveillance	Film: What's Killing the Children		
10 (10/30)	Midterm 2		MPH 1-4 EPI 1 PHDE 4	Midterm examination in which students are asked to: calculate cumulative incidence, attributable risk (absolute and relative forms) using data from a prospective study; interpret p-values for hypothesis testing; select sampling methods to obtain representative samples from a given target population; calculate sensitivity, specificity, and positive predictive value for a screening test
11 (11/06)	Lec: Intro to Study Design (Chap. 12-14)*	Lec: Study Design-II		
12 (11/13)	Lec: Study Design-III	Lec: Study Design-IV		
13 (11/20)	Ex 4: Cohort Studies	Film: Deadly Deception	MPH 1& 4	In class exercise in which students are asked to: calculate cumulative incidence and incidence density
14 (11/27)	Lec: Ethical Issues in Human Studies	Ex 5: Study Design Critique (Chap. 17)*	PHDE 10 & 14	In class exercise in which students are asked to: interpret 95% confidence intervals around a measure of association; critique a study design and select appropriate research study designs
15 (12/04)	Lec: Association and Causation (Chap. 16)*	Ex 6: Multifactorial Causation	MPH 4	In class exercise in which students are asked to: interpret data from a published study showing multifactorial causation
16 (12/11)	Review Session			
17 (12/18)	Final Exam		MPH 1-4 EPI 1 & 4 MSE1 PHDE 1, 3, 7, 8 PHDE 14	Final examination in which students are asked to: identify common study designs, select the appropriate data collection method for the study design, calculate and interpret a measure of association, interpret the results of the analysis, apply concepts of causation to the study findings. The final exam is cumulative and covers the material presented in class during the semester.
*Refers to Chapters in A Study Guide to Epidemiology and Biostatistics, 7th Edition				

6. Grade Distribution

	Assignment	Points	Percentage
1.	Midterm Examination 1	25	30
2.	Midterm Examination 2	25	30
3.	Final Examination	40	40
	TOTAL:	**90**	**100%**

7. Grading Scale

Grade	%age	This course will use the +/– grading system
A+ A A-	97-100 93-96 90-92	Excellent, distinctive work. Demonstrates sophisticated understanding: Nuanced and insightful account, powerful and effective application of concepts, frameworks and theories discussed in class and articulated in written work.
B+ B B-	87-89 83-86 80-82	Above average work. Demonstrates accomplished understanding: Thorough, well-documented account; adequate and apt application of concepts, frameworks and theories discussed in class and articulated in written work.
C+ C C-	77-79 73-76 70-72	Average work, sufficient, but not distinctive. Acceptable view with some misconceptions or oversight; not fully supported; acceptable but limited application of concepts, frameworks and theories discussed in class.
D+ D D-	67-69 63-66 60-62	Poor, insufficient work. Naïve or inadequate understanding: simplistic account and use of concepts, frameworks and theories discussed in class. Unable to articulate thoughts and ideas in written work.
F	<60	Unacceptable work

8. Course Policies

- Students are expected to attend class and participate in class discussions.
- Students will be graded on their performance on two midterm examinations (each contributing 30% of the grade) and a final examination (worth 40% of the grade). Material will be taken from the lectures, readings, exercises, and videos. Grades will be assigned based on overall course percentage score.
- Cheating will result in a failing ("F") grade. Students should familiarize themselves with the university of Hawai'i Student Conduct Code.
- No extra credit assignments given.

9. University Policies

- **Equal Opportunity and Affirmative Action Policy**
  The University of Hawai'i is an equal opportunity/affirmative action institution and is committed to a policy of nondiscrimination on the basis of race, sex, gender identity and expression, age, religion, color, national origin, ancestry, citizenship, disability, genetic information, marital status, breastfeeding, income assignment for child support, arrest and court record (except as permissible under State law), sexual orientation, national guard absence, status as a covered veteran, pregnancy, and domestic or sexual violence victim status. This policy covers admission and access to and participation, treatment, and employment in the University's programs and activities. For more information on equal opportunity and affirmative action policies and complaint procedures for the UHM Campus, contact:

  a) Students: Lori Ideta, Interim Vice Chancellor for Students, EEO/AA & ADA Coordinator
     Ph. - 956-3290 (V/T); Email - vcs@hawaii.edu
  b) Students with Disabilities: Ann Ito, KOKUA Program Director
     Ph. - 956-7511 (V/T); Email - kokua@hawaii.edu
  c) Students & Employees: Dee Uwono, Office of Title IX Director & Coordinator
     Ph. - 956-2299 (V/T); Email – t9uhm@hawaii.edu
  d) Employees: Mark Au, EEO/AA Director, Deputy Title IX & ADA Coordinator
     Ph. - 956-7077; Email - eeo@hawaii.edu

- **Disability Access**
  A student who may need an accommodation based on the impact of a disability is invited to contact me privately within the first weeks of the course. I would be happy to work with you and the KOKUA Program (Office for Students with Disabilities) to ensure reasonable accommodations in my course. KOKUA is responsible for facilitating accommodations for students with documented disabilities and can be reached at 956-7511 (voice/text) or in QLC 013.

- **Counseling Services and Mental Health**
  From time to time, we all need help managing stress and life problems. Occasionally, school can seem overwhelming, especially when balancing other responsibilities such as family and work. The University's Counseling & Student Development Center (CSDC) offers support to all UHM students to assist with personal, academic and career concerns. All services are confidential. Individual, couples and group counseling services are free of charge. To schedule an appointment, visit the CSDC website at http://manoa.hawaii.edu/counseling/ or call (808) 956-7927.

- **University of Hawai'i Student Conduct Code and Academic Dishonesty**
  The University expects students to maintain standards of personal integrity that are in harmony with the educational goals of the institution; to respect the rights, privileges, and property of others; and to observe national, state, and local laws and University regulations.

  Academic dishonesty such a plagiarism, cheating and other forms of dishonesty will result in a failing ("F") grade for the assignment. More than one incident of academic dishonesty will result in failing ("F") grade for the course. Equally, more than one incident will also result in reporting the academic dishonesty to the UH Office of Judicial Affairs.

  Student should familiarize themselves with the University of Hawai'i Student Conduct Code: http://studentaffairs.manoa.hawaii.edu/policies/conduct_code/.

10. Required Text or Readings

A Study Guide to Epidemiology and Biostatistics, 7th edition, by JR Hebel and RJ McCarter.

11. Foundational & Specialization Competencies Addressed

MPH FOUNDATIONAL COMPETENCIES	
MPH1.	Apply epidemiological methods to the breadth of settings and situations in public health practice.
MPH2.	Select quantitative and qualitative data collection methods appropriate for a given public health context.
MPH3.	Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate.
MPH4.	Interpret results of data analysis for public health research, policy or practice.

SPECIALIZATION COMPETENCIES	
EPIDEMIOLOGY	
EPI1.	Identify public health practices for disease control including surveillance, screening and outbreak investigation, including the use of biomarkers and molecular biology.
EPI4.	Apply epidemiologic-specific theoretical constructs, research design, research methodology, and analytic strategies.

MS COMPETENCIES	
MSE1.	Apply epidemiologic-specific theoretical constructs, research design, research methodology, and analytic strategies.

PHD (EPI) COMPETENCIES	
PHDE1.	Apply appropriate epidemiologic techniques and data sources to quantitatively assess patterns and changes in disease occurrence.
PHDE3.	Explain the central role of causation in epidemiology, including knowledge of various definitions and concepts of causation.
PHDE4.	Apply the principles of screening and of surveillance systems, the concepts of validity and reliability of screening tests, and identify the types of surveillance systems and approaches used in disease surveillance.
PHDE7.	Select and apply epidemiology study designs that are appropriate to address specific research questions or hypotheses.
PHDE8.	Explain how consideration of causal inference, sources of bias, and of sampling, statistical, and other methods can improve the validity of epidemiologic studies.
PHDE10.	Develop and constructively critique epidemiologic research proposals and papers.
PHDE14.	Interpret epidemiologic study results, make appropriate inferences based on results, and recognize the implications of the research results.

TENTATIVE COURSE SCHEDULE

PH 663, PRINCIPLES OF EPIDEMIOLOGY I

Fall, 2019 (Wednesdays, 9:00-11:50)

Date	Hour 1 (9:00-10:15)	Hour 2 (10:30-11:50)
28 August	Introduction	Film: Plagues
4 September	Lec: Investigation of an Epidemic (Chap. 1)*	Ex 1: Snow and Cholera
11 September	Lec: Vital Statistics/Measures of Mortality/Incidence & Prevalence (Chap. 2, 3)*	Ex 2: Rates and Adjustments (Parts A and B)
18 September	Ex 2: Rates and Adjustments (Part C: Direct Method Only)	
25 September	**MIDTERM I** (9:00-10:15)	
2 October	Lec: Measurements of Risk (Chap. 4)*	Lec: Biological Variability (Chap. 5)*
9 October	Lec: Screening (Chap. 7)*	Ex 3: Measurements of Error
16 October	Lec: Sampling (Chap. 8)*	Lec: Statistical Significance (Chap. 9)*
23 October	Lec: Surveillance	Film: What's Killing the Children
30 October	**MIDTERM II** (9:00-10:15)	
6 November	Lec: Intro to Study Design (Chap. 12, 13, 14)*	Lec: Study Design–II
13 November	Lec: Study Design–III	Lec: Study Design–IV
20 November	Ex 4: Cohort Studies	Film: Deadly Deception
27 November	Lec: Ethics in Human Studies	Ex 5: Study Design Critique (Chap. 17)*
4 December	Lec: Association and Causation (Chap. 16)*	Ex 6: Multifactorial Causation
11 December	Review Session -	
18 December	**FINAL EXAM** -	

*Refers to Chapters in **A Study Guide to Epidemiology and Biostatistics, Seventh Edition**

Public Health Prevention Levels

Primary Prevention: Prevent the disease before it starts. Goal is to reduce the incidence of the disease.

Secondary Prevention: Early detection and prompt treatment of the disease. Goal is to reduce the prevalence of the disease.

Tertiary Prevention: Limiting disability and assisting with rehabilitation after the disease has occurred and left residual damage. Goal is to reduce the impact or complications of the disease.