

# Course Syllabus

Adjunct Professor : Kenneth Rothman

Course	An Introduction to Epidemiologic Research		
Credit	1	Method of Teaching	Lecture

## Objective

The objective of the course is to lay the conceptual foundation for understanding epidemiologic study design and data analysis. This foundation will include a conceptual basis for defining causes, understanding causal inference, measuring disease occurrence and effects of exposures, designing cohort and case-control studies to improve precision and validity, and a quantitative approach to data analysis and interpretation.

By the end of the course, students should be able to:

1. distinguish causes in terms of components and mechanisms;
2. explain the characteristics of the primary epidemiologic measures;
3. describe the principal types of cohort studies and differentiate among them;
4. explain the conceptual similarities and differences between cohort and case-control studies;
5. describe the role of precision and bias in estimating effects, and discuss how to limit them;
6. explain the advantages of viewing research studies as measurement exercises;
7. distinguish statistical from biologic interaction, and explain how to measure the latter;
8. list the advantages and disadvantages of stratified analysis relative to regression modeling.

## Outline

The major topics to be covered include the following.

- Causation:

*Concepts of causation and causal inference will be presented.*

*Causal criteria will be criticized.*

*Alternatives to causal interpretations will be considered and discussed in the context of the principles of study design.*

- Measures of Disease Frequency and Measures of Association:

*Characteristics of basic measures of disease frequency (incidence proportion, incidence rate, and prevalence) will be discussed.*

*Measures of association, based on contrasts between these measures, will be presented, along with the use, interpretation, and interrelationship of these measures.*

- Epidemiologic Study Design:

*The underlying theory, advantages and disadvantages of the basic study designs will be presented, including both cohort*

*and case-control studies.*

- Principles of Epidemiologic Data Analysis:

*The principles of epidemiologic analysis will be emphasized, along with a discussion of methods to assess chance, control for confounding, and assess effect-measure modification and biologic interaction.*

### **Class Schedule (90 minutes each)**

1. Causation and Causal Inference (11 Jan Sat 10:00--11:30)
2. Epidemiologic Measures of Occurrence and Effect (11 Jan Sat 13:00--14:30)
3. Design of Cohort Studies (11 Jan Sat 15:30--17:00)
4. Design of Case-control Studies (12 Jan Sun 10:00--11:30)
5. Dealing with Random Error and Biases in Study Design (12 Jan Sun 13:00--14:30)
6. Principles of Data Analysis (12 Jan Sun 15:30--17:00)
7. Estimating Biologic Interaction (13 Jan Mon 10:00--11:30)
8. Stratified Analysis versus Regression Modeling (13 Jan Mon 13:00--14:30)

*We may add seminars by Japanese teachers for each to assist students with difficulty in language/background knowledge*

### **Text**

Kenneth J. Rothman. Epidemiology: An Introduction – 2nd edition. Oxford University Press. 2012

### **Related readings**

Will be provided, either in paper form, or in electronic form

### **Achievement evaluation**

Students are expected to attend all classes, read the course material before coming to class, and actively engage in course discussions.

There will be a written final exam for credit after the completion of the course. (13 Jan Mon 15:30--17:00)