

**EPID 715**  
**Theory and Quantitative Methods in Epidemiology**  
**2013 Syllabus**

**DESCRIPTION**

An in-depth treatment of key methodologic topics in epidemiologic research, including problem conceptualization, study design, research conduct, data analysis and interpretation.

**PREREQUISITES**

EPID 705  
EPID 710 (or approved equivalent)

**COREQUISITES**

EPID 716 (companion course)  
BIOS 545 (or approved equivalent)

**INSTRUCTIONAL TEAM**

|                            |  |
|----------------------------|--|
| <b>Instructor</b>          | Charles Poole<br>2401A McGavran-Greenberg<br>Email: <a href="mailto:cpoole@unc.edu">cpoole@unc.edu</a><br>Phone: 919-918-3808<br>Office hours by appointment   |
| <b>Teaching assistants</b> | Sara Jones ( <a href="mailto:sara.jones@unc.edu">sara.jones@unc.edu</a> )<br>Tracy Kinsey ( <a href="mailto:tkinsey@unc.edu">tkinsey@unc.edu</a> )<br>Dwight Yin ( <a href="mailto:dyin@unc.edu">dyin@unc.edu</a> )<br>Sabrina Zadrozny ( <a href="mailto:sabrinaz@unc.edu">sabrinaz@unc.edu</a> ) |

**REQUIRED TEXT**

Rothman KJ, Greenland S, Lash TL. *Modern Epidemiology*. Third edition. Philadelphia: Lippincott Williams & Wilkins, 2008.

## OUTCOME MEASURES

|                     |         |
|---------------------|---------|
| Class participation | 10%     |
| Exercises           | 6 @ 10% |
| Quizzes             | 3 @ 10% |

## GRADES

|             |   |
|-------------|---|
| <60.0       | F |
| 60.0 – 74.9 | L |
| 75.0 – 89.9 | P |
| ≥90.0       | H |

## SCHEDULE

Class meets 10:00 – 11:50 AM in Hooker 0001 on the following dates:

| <u>Monday</u> | <u>Event</u>    | <u>Wednesday</u> | <u>Event</u>            |
|---------------|-----------------|------------------|-------------------------|
| Jan 7         | No class        | Jan 9            | Lecture                 |
| Jan 14        | Lecture         | Jan 16           | Lecture                 |
| Jan 21        | No class        | Jan 23           | Lecture, Exercise 1 due |
| Jan 28        | Lecture         | Jan 30           | Lecture                 |
| Feb 4         | Lecture, Quiz 1 | Feb 6            | Lecture                 |
| Feb 11        | Lecture,        | Feb 13           | Lecture, Exercise 2 due |
| Feb 18        | Lecture         | Feb 20           | Lecture                 |
| Feb 25        | Lecture         | Feb 27           | Lecture                 |
| Mar 4         | Lecture, Quiz 2 | Mar 6            | Lecture, Exercise 3 due |
| Mar 11        | No class        | Mar 13           | No class                |
| Mar 18        | Lecture         | Mar 20           | Lecture                 |
| Mar 25        | Lecture         | Mar 27           | Lecture, Exercise 4 due |
| Apr 1         | Lecture         | Apr 3            | Lecture,                |
| Apr 8         | Lecture, Quiz 3 | Apr 10           | Lecture, Exercise 5 due |
| Apr 15        | Lecture         | Apr 17           | Lecture                 |
| Apr 22        | Lecture         | Apr 24           | Lecture, Exercise 6 due |

## HONOR CODE

University policy requires all students to familiarize themselves with all provisions of the Instrument of Student Governance. The following links provide all the needed information: <http://honor.unc.edu/> and <http://instrument.unc.edu/>. These links are also provided on the course web site.

Appendix A of the Instrument states that each student is expected to “[s]ign a pledge on all graded academic work certifying that no unauthorized assistance has been received or given in the completion of the work.” *The instructor reserves the right to deduct points without warning if the pledge is not written and signed on each written, graded assignment, whether or not a reminder is given.* The general specifications of “unauthorized assistance” are given below for the class participation problems, take-home exercises and in-class quizzes. Additional specification of “unauthorized assistance” may appear on particular exercises and quizzes.

## **CLASS PARTICIPATION**

Selected lecture slides contain problems to aid your preparation for class. Each student will discuss one problem with the instructor in class. The score will be 0 for being unprepared and 100 for showing that you tried your best on the problem before coming to class, even if you “get it all wrong.”

After a slide set is posted, you are encouraged to reserve a problem by contacting the course instructor. If no one reserves a problem or volunteers to do it in class, someone who has not yet done one will be selected at random from the class roster.

There is no “unauthorized assistance” in preparing these problems: no restrictions on whom or what you may consult in preparing them. You are encouraged to work together on them and to contact the teaching assistants, instructor or anyone else for clarification.

## **EXERCISES**

There will be 6 take-home exercises. Each one will be posted on the course web site, usually about a week before it is due. An announcement will be sent when each one is posted. The exercises are due to the teaching assistants on Wednesdays before class starts at 10:00 AM, with no exceptions. The late penalty is 15 points for each day or fraction thereof.

Please make your answers legible. Use a word processor if necessary. If you are given instructions, please follow them. Otherwise, use your best judgment (e.g., on rounding). Show your work, whether instructed to or not. Use your best judgment about how much work to show. Picture yourself as a grader who wants to be informed but not overwhelmed with detail.

Unless instructed otherwise, you are to complete the exercises on your own. “Unauthorized assistance” thus consists of: (a) any communication with anyone other than the instructor and teaching assistants and (b) exams, exercises and answer keys from this course from previous years. (The old course number was EPID 268.) You may discuss course content with classmates while working on an exercise, but not the specific questions on that exercise. Specific exercises may relax these specifications or tighten them, especially with regard to the use of spreadsheets, programming or applications.

## QUIZZES

The 3 quizzes will be in-class and open-book, but there will not be enough time to look up very much. The quizzes will be modifications of the “true/false” format, to be explained in class. “Unauthorized assistance” consists of (a) any communication with anyone other than the instructor and teaching assistant, (b) use of any devices that can communicate with other devices and (c) use of spreadsheets, programming or application. You may need a calculator. Inexpensive calculators without communication capabilities are readily obtained at the university book store and other retail outlets.

## READINGS

You are responsible for all the material in the required textbook readings. The lectures are intended only to supplement this material and to clarify and amplify some of it.

### **Required textbook readings by topic:**

#### *Populations and measures of disease frequency*

32-49            Skim or skip “Other types of rates,” 39-40.

100-110

289-293            Skim or skip the material on variances and confidence intervals.

#### *Effect measures*

5-18

51-67

69-70

213-219

295-298

300-317

#### *Effect-measure modification*

71-83            You don’t have to memorize the numbers of the 16 response types.

279-280

298-300

#### *Confounding*

49-50

67-70

129-134

168-169

183-209

258-278            You don’t have to memorize expressions 15-7 through 15-22 or

expression 15-24.

Skim or skip “Unconditional versus conditional analysis,” 272-273.

Skim or skip “P-values for stratified person-time data” and “P-values for stratified pure count data,” 277-278.

345-352 You don’t have to memorize expressions 19-1 through 19-3.

*Case-control and related designs*

87-99

111-127

*Information bias*

137-147

352-361

*Selection bias and missing data*

128-129

134-137

138-140

219

362-363

*Multiple bias analysis*

363-380

*Estimation and testing*

151-169

219-221 Skim or skip “Approximate Statistics: The Score Method,” 225-226.

Skim or skip “Approximate Statistics: The Likelihood Ratio Method,” 229-230.

Skim or skip “Joint Confidence Regions,” 235-236.

238-257 You don’t have to memorize the variance formulas.

317-344

*Design features affecting precision*

148-150

169-182

283-288

**Consecutive list of required textbook pages:**

5-18

32-221

238-380



**Additional required readings:**

These readings will be posted on the course web site. Some are methodologic papers. Others are illustrative research reports used as examples.

**PREPARATION FOR CLASS**

The following are strongly recommended:

1. Before coming to class, do the readings and study the slides..
2. Do all the class participation problems before coming to class, even after you've done yours orally.
3. Form or join a study group. If it isn't right for you, form or join another one.
4. Consult the posted web sites.
5. Ask questions in class and outside of class, especially about the class participation problems, especially before they come up in class.

**EPISHEET**

An Excel workbook called Episheet.xls is posted on the course web site. We will use it a lot. Please familiarize yourself with it.

This spreadsheet program contains macros. To get it to work properly, you may need to relax your computer's security settings.

**AUDITORS**

Auditors are welcome, space permitting. If you might take the course for credit in the future, do not become acquainted with the exercises, exams or answer keys for this or previous years. Familiarity with that material will disqualify you from being able to take the course for credit.