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Spring 2015

EPID 7133 - Epidemiologic Research Methods I

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Georgia Southern University
Jiann-Ping Hsu College of Public Health

EPID 7133 – Epidemiologic Research Methods I (3 credits)

Spring 2015

Updated as of February 4, 2015

<u>Instructor:</u>	Isaac Chun-Hai Fung, Ph.D.
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<u>E-Mail Address:</u>	cfung@georgiasouthern.edu
<u>Office Hours:</u>	Wednesday, 1:00-6:00 PM (Students are highly encouraged to make appointment)
<u>Web Page:</u>	https://sites.google.com/a/georgiasouthern.edu/fung/
<u>Class Meets:</u>	Thursday, 6:30 pm – 9:15 pm (Education Building 3153)

COURSE DESCRIPTION

Prerequisites: PUBH6533 or permission of the instructor

Catalog Description:

This course will focus on epidemiologic methods - primarily methods used in observational studies, cohort studies, case-control studies and randomized controlled trials. With respect to cohort studies, topics covered include cohort identification, ascertainment of exposure status, follow-up of cohort members, measuring outcomes, sources of bias and interpretational issues. Case-control topics include issues around defining cases and controls, control of confounding, and sources of bias/systematic error. Topics around randomized trials include randomization procedures, defining and assembling treatment/intervention arms, selecting study subjects and approaches to data collection. Other topics covered in this course include surveillance and ecologic studies. Pros and cons of all study designs will be discussed, in part through readings of published papers. Fundamentals of data analysis will also be addressed, but a detailed discussion is reserved for Epidemiology Research II (EPI 7134).

Required Textbook:

Moyses Szklo and F. Javier Nieto (2014) *Epidemiology: Beyond the Basics (3rd edition)*. Jones & Bartlett. ISBN: 9781449604691

Supplemental reading materials may be provided by the instructor.

Required Software / Programming Language:

Please install the following software into your own laptop computers before the first R practicals.

- The **R** software is freely available at <http://cran.r-project.org/> (for Windows, Mac or Linux).
- **R Studio** is a free and open source integrated development environment for R. It is freely available at <http://www.rstudio.com/>.

JPHCOPH MPH Program Core Student Learning Outcomes:

At the completion of this program the student will be able to:

1. Demonstrate proficiency and effectiveness in the communication of core public health principles and practices, both oral and written.
2. Demonstrate proficiency in the integration of the core public health disciplines (Biostatistics, Epidemiology, Environmental Health, Health Policy/Management, and Social/Behavioral Science) in practice and research.
3. Demonstrate proficiency in problem solving, critical thinking, and public health leadership.

Epidemiology Concentration Student Learning Outcomes:

At the completion of this program the student will be able to:

1. Formulate population-based hypotheses and develop appropriate research designs to test these hypotheses.
2. Collect, analyze, and interpret data derived from population-based research.
3. Create and implement public health surveillance systems for population-based studies.
4. Recommend evidence-based interventions and control measures in response to epidemiologic findings.
5. Communicate epidemiologic principles and concepts to lay and professional audiences through both oral and written communication.

Course Learning Objectives:

At the completion of this course the student will be able to:

1. Understand the basic designs of epidemiological study. (Epi 1)
2. Understand validity and threats to validity in epidemiologic studies. (Core 3)
3. Handle threats to validity at the stages of study design and data analysis. (Core 3, Epi 1, 2, 3, 4)
4. Use R to do basic data management and basic statistics. (Core 2, 3)
5. Write a review article of scholarly literature. (Core 1, 2; Epi 5)

Mid-term Exam: A take-home exam will be available in FOLIO. Students are required to type their answers to a Word document and submit it electronically to FOLIO by the end of the prescribed exam period. You are required to complete your mid-term exam independently.

Final Exam: A take-home exam will be available in FOLIO. Students are required to type their answers to a Word document and submit it electronically to FOLIO by the end of the prescribed exam period. You are required to complete your Final exam independently.

IRB training certificate: All researchers, including students – are expected to satisfy institutional stewardship obligations and to perform their research and scholarship pursuits in compliance with federal, state, and local laws, as well as the policies and procedures of the Georgia Southern University. Research compliance encompasses a wide variety of subjects including human and animal subjects; pre- and post-award management; access to and retention of data; environmental and workplace safety; intellectual property; conflicts of interest; and scholarly integrity in research. As a part of the research preparation for your future research, including both your class project in EPID 7134 (Epidemiological Research Method II) and your capstone, you are requested to obtain an IRB training certificate on the basic course. The training will be performed online using self-learning module (<https://www.citiprogram.org>), it is your responsibility to carefully manage your pace, follow the instructions, obtain the certificate and submit the electric copy to the instructor before the due date (before the last class meeting). IRB certificate, which is in fail/pass format, contributes 5% of the final grade.

Review paper: The instructor will teach students the basic requirements of writing a review paper. The emphasis will be on the proper procedures of keyword selection, bibliographic database search, paper retrieval (including inter-library loan), as well as data retrieval, summary and presentation. A topic will be announced to the class.

Grading:

Weighting of assignments for the purposes of grading will be as follows:

<u>Component</u>	<u>%</u>
IRB training certificate (pass/fail)	5
Review paper	20
Mid-term exam	20
Final exam	25
Practicals & Assignments	30

The following point scale will be utilized in grading:

- A: 90- 100%
- B: 80% - 89.9%
- C: 70% - 79.9%
- D: 60% - 69.9%
- F: < 60.0%

All assignments will be graded and returned promptly so that students may accurately calculate their grades at any point in time during the semester.

Due time:

All homework assignments and training certificate should be electronically submitted to *dropboxes provided in FOLIO*, by 6.30 pm on the due date. Please also submit (in class) to the instructor hard-copies that are due at the same time. Early submission will be welcome.

Late submission:

Reduction of 5% for every 24 hours. For example, for an assignment that is due on Thursday at 6.30pm, if someone submits it on the coming Saturday at 6.29pm, then:

$$\text{Final Grade} = \text{Grade} * 90\%$$

There are times when extraordinary circumstances occur (e.g., serious illness, death in the family, etc.). In such circumstances, please consult with the instructor within a reasonable amount of time. The instructor will consult the college administrators and verify the reported circumstances before any exemptions or extensions can be granted.

Nota Bene: Extensions are not guaranteed and will be granted solely at the discretion of the instructor.

Extra credit:

Students may earn extra credit by attending the Disease Dynamics Seminars that are held outside class time (1% of the Final Grade per seminar). Students who are unable to attend the seminars may submit a brief (1-2 page) summary of the speaker's designated paper (or powerpoint; according to the specific instructions given by the instructor) in lieu of attendance and earn the extra credit.

For details about the Disease Dynamics Seminars, please visit:

<https://sites.google.com/a/georgiasouthern.edu/fung/disease-dynamics-seminars>

Academic Misconduct:

As a student registered at this University, it is expected that you will adhere to only the strictest standards of conduct. It is recommended that you review the latest edition of the *Student Conduct Code* book, as well as the latest *Undergraduate & Graduate Catalog* to familiarize yourself with the University's policies in this regard. Your continued enrollment in this course is an implied contract between you and the instructor on this issue; from this point forward, it is assumed that you will conduct yourself appropriately.

Academic integrity relates to the appropriate use of intellectual property. The syllabus, lecture notes, and all materials presented and/or distributed during this course are protected by copyright law. Students are authorized to take notes in class, but that authorization extends only to making one set of notes for personal (and no other) use. As such, students are not authorized to sell, license, commercially publish, distribute, transmit, display, or record notes in or from class without the express written permission of the instructor.

Plagiarism:

According to the Academic Dishonesty Policy of GSU, plagiarism includes but is not limited to:

- A. Directly quoting the words of others without using quotation marks or indented format to identify them.
- B. Using published or unpublished sources of information without identifying them.
- C. Paraphrasing material or ideas without identifying the source.
- D. Unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic material.

If you are accused of plagiarism, the following policy per the Judicial Affairs website

(<http://students.georgiasouthern.edu/judicial/faculty.htm>) will be enforced:

PROCEDURES FOR ADJUDICATING ACADEMIC DISHONESTY CASES**First Offense - In Violation Plea**

1. If the professor and the Dean of Students agree that the evidence is sufficient to warrant a charge of academic dishonesty, the professor should contact the Office of Judicial Affairs to determine if this is a first violation of academic dishonesty. The incident will be reported via the following website: <http://students.georgiasouthern.edu/judicial/faculty.htm>
2. If it is a first violation, the professor should talk with the student about the violation. If the student accepts responsibility in writing and the professor decides to adjudicate the case, the following procedures will be followed:
 - a. The student will be placed on disciplinary probation for a minimum of one semester by the Office of Judicial Affairs.
 - b. The student will be subject to any academic sanctions imposed by the professor (from receiving a 0 on the assignment to receiving a failing grade in the class).
 - c. A copy of all the material involved in the case (Academic Dishonesty Report Form and the Request For Instructor to Adjudicate Form) and a brief statement from the professor concerning the facts of the case and the course syllabus should be mailed to the Office of Judicial Affairs for inclusion in the student's discipline record.

First Offense - Not In Violation Plea (student does not admit the violation)

1. If the professor and the Dean of Students agree that the evidence is sufficient to warrant a charge of academic dishonesty, the professor should contact the Office of Judicial Affairs to determine if this is the first or second violation of academic dishonesty. The student will be charged with academic dishonesty and the University Judicial Board or a University Hearing Officer would hear the case. If the student is found responsible, the following penalty will normally be imposed:
 - a. The student will be placed on Disciplinary Probation for a minimum of one semester by the Office of Judicial Affairs.
 - b. The student will be subject to any academic sanctions imposed by the professor.

Second Violation of Academic Dishonesty

1. If the professor and the Dean of Students agree that the evidence is sufficient to warrant a charge of academic dishonesty, and if it is determined this is the second violation, the student will be charged with academic dishonesty and the University Judicial Board or a University Hearing Officer would hear the case.
2. If the student is found responsible, the following penalty will normally be imposed:
 - a. Suspension for a minimum of one semester or expulsion.
 - b. The student will be subject to any academic sanctions imposed by the professor.

NOT RESPONSIBLE FINDING

When a student is found not responsible of academic dishonesty, the work in question (assignment, paper, test, etc.) would be forwarded to the Department Chair. It is the responsibility of the Department Chair to ensure that the work is evaluated by a faculty member other than the individual who brought the charge and, if necessary, submit a final grade to the Registrar. For the protection of the faculty member and the student, the work in question should not be referred back to the faculty member who charged the student with academic dishonesty.

In the case of a Department Chair bringing charges against a student, an administrator at the Dean's level will ensure that the student's work is evaluated in an appropriate manner.

Academic Handbook:

Students are expected to abide by the Academic Handbook, located at <http://students.georgiasouthern.edu/sta/guide/>. Your failure to comply with any part of this Handbook may be a violation and thus, you may receive an F in the course and/or be referred for disciplinary action.

University Calendar for the Semester:

The University Calendar is located with the semester schedule, and can be found at: <http://www.georgiasouthern.edu/current.php>.

Attendance Policy:

Federal regulations require attendance be verified prior to distribution of financial aid allotments. Regular attendance is expected and will be recorded. *Failure to attend class will negatively impact your participation grade.*

Portfolio Inclusion:

Samples of your work may be reproduced for research purposes and/or inclusion in the professor's teaching portfolio. You have the right to review anything selected for use, and subsequently ask for its removal.

Retaining of Original Work:

All original examinations, papers, etc. may be retained by the instructor for documentation and accreditation purposes. If you wish to obtain a copy of your graded work that has been retained, come by the instructor's office and we will make a copy for your records.

Expectation of hours of work outside class time:

For this course, students are expected to spend **at least 6 hours per week** outside class time, to read their textbooks and other reading materials and to complete their assignments and other required tasks. Some students may need more time, depending on each student's abilities and circumstances.

Office hours:

Students are **highly recommended to make an appointment** with the instructor, even if they plan to meet him during office hours. The instructor may be meeting another student when you arrive at his office. Making appointments allow you to have priority over any students who do not make an appointment. This also allows the efficient use of your time and the instructor's time.

One Final Note:

The contents of this syllabus are as complete and accurate as possible. The instructor reserves the right to make any changes necessary to the syllabus and course material. The instructor will announce any such changes in class. It is the responsibility of the student to know what changes have been made in order to successfully complete the requirements of the course.

COURSE OUTLINE

The course outline is subject to future changes. Changes will be announced in class.

Date		Topics	Readings & Assignments
01/15	1	Course introduction Lecture 1: Epidemiology: Past, Present and Future Research Methods Overview Associations and causality Overview of study designs How to write a review paper	CITI IRB training Chapters 1 – 3 Grimes and Schulz (2002) Descriptive studies: what they can and cannot do, <i>Lancet</i> , 359:145-149. Grimes and Schulz (2002) An overview of clinical research: the lay of the land. <i>Lancet</i> , 365:57-61.
01/22	2	Guest instructor: Dr. Yelena Tarasenko. [Dr Fung will be out of town] Class Time: 6.45pm – 9.30pm Practical 1: Directing prevention at populations or individuals? Prevention, populations and attributable risk Practical 2: Using Routine Data in a Developing Country. Injury: a health problem of increasing importance	
01/29	3	Lecture 2: Validity, internal vs external (including Measurement, exposure and endpoint); Bias, confounding Effect modification Practical 3: Cross-sectional study. The British National Survey of Sexual Attitudes and Lifestyles	IRB certificate due Submit the search strategies and search results of the review paper Chapters 4 – 6 Grimes and Schulz (2002) Bias and causal associations in observational research. <i>Lancet</i> , 359: 248-252. Grimes and Schulz (2002) Uses and abuses of screening tests. <i>Lancet</i> , 359: 881-884.
02/05	4	Lecture 3 Exclusion and Stratification Practical 4: Case control study: Alcohol consumption and the risk of breast cancer Practical A1: Age standardization	<i>Complete Practical A1 if you cannot finish it in class</i> Chapter 7.1 – 7.3 Schulz and Grimes (2002) Case-control studies: research in reverse. <i>Lancet</i> , 359:431-434. Grimes and Schulz (2005) Compared to what? Finding controls for case-control studies. <i>Lancet</i> , 365:1429-33.
02/12	5	<i>Discuss Practical A1</i> Practical 5: Asbestos and respiratory cancer: a review of the evidence from cohort studies Practical A2: Validity assessment	<i>Complete Practical A2 if you cannot finish it in class</i> Grimes and Schulz (2002). Cohort studies: marching towards outcomes. <i>Lancet</i> , 359:341-345.
02/19	6	<i>Discuss Practical A2</i> Practical 6: Intervention study: Vaccine Trial Practical A3: Tuberculosis	<i>Complete Practical A3 if you cannot finish it in class</i> Schulz and Grimes (2002). Generation of allocation sequences in randomised trials: chance, not choice. <i>Lancet</i> , 359:515-19. Schulz and Grimes (2002). Allocation concealment in randomised trials: defending

			<p>against deciphering. <i>Lancet</i>. 359:614-618.</p> <p>Schulz and Grimes (2002). Blinding in randomised trials: hiding who got what. <i>Lancet</i>, 359:696-700.</p> <p>Schulz and Grimes (2002). Unequal group sizes in randomised trials: guarding against guessing. <i>Lancet</i>, 359: 966-70.</p>
02/26	7	<p>Discuss Practical A3</p> <p>Practical 7: Problem-based exercise: Vitamin A Deficiency</p>	
03/05	8	Mid-term Exam	
03/12	9	<p>Review Mid-term exam paper</p> <p>Lecture 4: Statistical power (sample size)</p>	<p>Schulz and Grimes (2005). Sample size calculations in randomised trials: mandatory and mystical. <i>Lancet</i>, 365:1348-53.</p> <p>Schulz and Grimes (2002). Sample size slippages in randomised trials: exclusions and the lost and wayward. <i>Lancet</i>, 359:781-85.</p>
03/19	10	No class – Spring break	N/A
03/26	11	Practical 8: R: Part1	<p>Bring your laptop computers</p> <p>Submit review paper</p>
03/27 (Fri)		<p>Optional Extra Credit Opportunity:</p> <p>Disease Dynamics Seminar (12pm-1pm) – Bishwa Adhikari, PhD, CDC.</p> <p>“Use of micro-needle patches in measles vaccination program: cost effectiveness analysis” (Tentative)</p>	
04/02		<p>Optional Extra Credit Opportunity:</p> <p>Disease Dynamics Seminar (2pm – 3pm) – Swati Debroy, PhD, Assistant Professor of Mathematics, University of South Carolina, Beaufort</p> <p>“Mathematical models to estimate Underreporting of Visceral Leishmaniasis Deaths in Bihar, India”</p>	
	12	Practical 9: R: Part 2 (6.30 – 9.15pm)	Bring your laptop computers
04/09	13	Practical 10: R: Part 3	Bring your laptop computers
04/16	14	<p>Lecture 5: Multivariable analyses (1)</p> <p>Practical 11: R: Part 4</p>	<p>Chapter 7 (7.4 - 7.5)</p> <p>Bring your laptop computers</p>
04/23	15	<p>Guest instructor: Dr. Jingjing Yin</p> <p>Lecture 6: Multivariable analyses (2): Cox regression model</p> <p>Practical 12: R: Part 5</p>	<p>Chapter 7 (7.6 - 7.8)</p> <p>Bring your laptop computers</p>
04/30	16	Final Exam	
05/07	17	<p>Review Final exam paper</p> <p>Lecture 7 & Discussion: Ethical issues in epidemiologic research</p>	<p>Coughlin (2006) Ethical issues in epidemiologic research and public health practice. <i>Emerging Themes in Epidemiology</i>, 2006, 3:16</p>