Western University
Epidemiology & Biostatistics

9553B
ANALYTIC EPIDEMIOLOGY
Winter, 2017

LOGISTICS AND CONTACT INFORMATION

Class: DSB 3008
Mondays, 9:30-12:30

Instructor: Greta R. Bauer, PhD, MPH
Associate Professor
Epidemiology & Biostatistics
K200 Kresge
519.661.2111 ext 86262
greta.bauer@schulich.uwo.ca

Office hours: After class, or by appointment

TA: Sharifa Nasreen
snasreen@uwo.ca
Office hours: By appointment

COURSE DESCRIPTION

Using published studies, epidemiologic research designs (including experimental, cohort and case-control approaches) will be extensively examined. The development and critique of study protocols is a substantial course requirement.

Prerequisites: Epidemiology 9551A and one of Epidemiology 9509A or Epidemiology 9510A or equivalents

NOTE: Unless you have either the requisites for this course or written special permission to enroll in it, you may be removed from this course and it will be deleted from your record. Students may seek permission from the Graduate Chair. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.
COURSE MATERIALS

Journal Articles, Worksheets and Assignments
- Downloadable via OWL site (https://owl.uwo.ca/portal)

Required Text

TEACHING METHODS

This course will be taught using a combination of different methods: Lectures and readings to introduce new materials, discussions and small group exercises in class to deepen understanding of concepts, and tutorials to integrate learning and put theories and methods into practice. Lectures will be used to develop material that the students have already familiarized themselves with. Thus, readings listed are to be done in advance of class. Students are expected to actively participate, both for their own benefit and to contribute to the learning of other students in the class.

Learning epidemiology requires mastering new ways of conceptualizing problems and information. Thus, students should expect to study, rather than read the materials, and allow adequate time for looking up unknown terms, working through questions, etc. Some materials in this course are theoretically complex and will need to be read and studied multiple times. It is expected that the bulk of course work will take place outside of class.

TECHNOLOGY REQUIREMENTS

You are responsible for all required course materials and announcements posted to the course’s OWL website. Slides will typically be posted in advance of lecture, and may be downloaded or printed for your personal note taking. Note that slides themselves are not course notes, and you will need to take notes. A copy of the syllabus is posted on OWL, as will be any worksheets or assignments at least one week prior to due dates. Required readings from the syllabus are posted together. Supplemental readings and web links may be posted from time to time for those who wish to read more on a particular topic. A basic scientific calculator (a non-networked device) may be needed for quizzes.

METHODS OF EVALUATION

Final course marks are based on the following components:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attendance and participation</td>
<td>5%</td>
</tr>
<tr>
<td>Completion of unmarked course components</td>
<td>5%</td>
</tr>
<tr>
<td>Assignment 1: Study Objectives</td>
<td>5%</td>
</tr>
<tr>
<td>Assignment 2: Directed Acyclic Graphs</td>
<td>15%</td>
</tr>
<tr>
<td>Assignment 3: Paper Critiques</td>
<td>10%</td>
</tr>
<tr>
<td>Quizzes (5 @ 3% each)</td>
<td>15%</td>
</tr>
<tr>
<td>Project Presentation</td>
<td>10%</td>
</tr>
<tr>
<td>Project Protocol</td>
<td>40%</td>
</tr>
</tbody>
</table>
**Attendance and participation**
Learning will be active and not all course material will be evaluated in quizzes or assignments. It is expected that students be present for learning of course material as documentation that the material has been covered, and to actively contribute to learning. Students missing >10% of lecture/ discussion/ workshop course time (more than four hours) will not pass the course unless arrangements have been approved in advance and additional learning assignments have been completed.

**Assignments**
Specific directions for assignments will be posted on OWL at the time of assignment. All late assignments will be marked down 10% of total mark value per day unless prior arrangements have been made.

**Quizzes**
Five short quizzes will be time-limited (typically 15 minutes) and held at the beginning of class. Together, these constitute the equivalent of one larger exam.

**Project Presentation**
Each student will have the opportunity to briefly present the research project they have designed for their final protocol. Students will respond to questions from other students, and may use this as an opportunity to identify areas to strengthen or redevelop prior to completion of the grant application.

**Project Protocol**
The final assignment will be composed of a protocol for an analytic epidemiologic study that is case-control, cohort, or cross-sectional in design (or a variation on one of these types of observational designs). Students who have taken Clinical Trials also have the option of developing a trial protocol. This will be the cumulative result of work done throughout the semester. The protocol body will meet the following requirements:

- Sections include the following (single spaced, 2 cm margins, 12-pt Times New Roman):
  - Stand-alone summary, 1 page maximum
  - Abstract, written for a lay audience, 350 words maximum
  - Project objectives and rationale, 1 page maximum
  - Project protocol, 6 pages maximum, text only
  - Knowledge translation plan, ½ page maximum
  - Appendix, no length limit
- The Appendix must contain references, a list/table of research personnel and time allotments, and a study timeline. Any tables and figures for the protocol (e.g. theoretical models, DAGs, preliminary data) are to be included in the appendix. A budget is not included.
- Topics used for grant proposals in your work, or in previous or concurrent courses are not admissible.
- You are encouraged to use this as an opportunity to develop a proposal on a topic related to your thesis project, or other areas of interest. However, all projects must propose the collection of original research data, and cannot reflect an existing project or thesis.
<table>
<thead>
<tr>
<th>Wk</th>
<th>Day</th>
<th>Topic</th>
<th>Reading</th>
<th>In advance</th>
<th>In class</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Jan. 9</td>
<td>Topic</td>
<td>Introduction to analytic epidemiology</td>
<td>In class</td>
<td>Lecture, discussion, group exercise. Also, brief tutorial on writing study objectives.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>In advance: Reading and debate preparation.</td>
<td>In advance: Reading and debate preparation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>In class: Debate on role of black box epidemiology</td>
<td>In class: Debate on role of black box epidemiology</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>In class: Lecture and discussion.</td>
<td>In class: Lecture and discussion.</td>
</tr>
<tr>
<td>4</td>
<td>Jan. 30</td>
<td>Topic</td>
<td>Confounding 1 - Collapsibility</td>
<td>Szklo and Nieto. Chapter 5 - Identifying non-causal associations: Confounding (some material will be review). Szklo and Nieto. Chapter 7, section 7.4 only.</td>
<td>Szklo and Nieto. Chapter 5 - Identifying non-causal associations: Confounding (some material will be review). Szklo and Nieto. Chapter 7, section 7.4 only.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>In advance: Read chapters and bring questions</td>
<td>In advance: Read chapters and bring questions</td>
</tr>
<tr>
<td></td>
<td>Feb. 3</td>
<td>Assignment</td>
<td>Draft of Assignment 1 (study objectives) due to be posted to OWL by 5:00 pm. Students are expected to post constructive comments on objectives of ≥3 other students by Wednesday, Feb. 8 at 5:00 pm.</td>
<td>Draft of Assignment 1 (study objectives) due to be posted to OWL by 5:00 pm. Students are expected to post constructive comments on objectives of ≥3 other students by Wednesday, Feb. 8 at 5:00 pm.</td>
<td>Draft of Assignment 1 (study objectives) due to be posted to OWL by 5:00 pm. Students are expected to post constructive comments on objectives of ≥3 other students by Wednesday, Feb. 8 at 5:00 pm.</td>
</tr>
</tbody>
</table>

**In advance**
- Read/study Maldonado paper (1-2 times) and Greenland and Robins paper (2-3 times) Bring questions.

**Feb. 10**
- Assignment: Assignment 1 due (final version) on OWL by 5:00 pm.

**6 Feb. 13**
- **Topic**: Confounding 3 - Directed acyclic graphs
  - Optional: Shrier I, Platt RW. Reducing bias through directed acyclic graphs. *BMC Medical Research Methodology* 2008;8:70.

  **In advance**
  - Readings. Recommend starting with Merchant first, then Greenland. Read Shrier if you find it helpful (Shrier doesn’t show how to create one, but how to test out a preset potential group of confounders using a DAG).
  - Worksheet: Directed Acyclic Graphs – complete to best of ability and bring two copies to class (one to turn in at beginning).

  **In class**
  - Quiz 2. Group discussion of worksheet DAG. Lecture and discussion regarding DAG construction and use.

**7 Feb. 20**
- **Family Day / Conference Week – No class**

**8 Feb. 27**
- **Topic**: Heterogeneity of effects 1
- **Reading**: Szklo and Nieto. Chapter 6 - Defining and assessing heterogeneity of effects: Interaction

**In advance**
- Reading. Bring questions.

**In class**
- Lecture and discussion.

**Mar. 3**
- Assignment: Assignment 2 due on OWL by 5:00 pm.

**9 Mar. 6**
- **Topic**: Heterogeneity of effects 2

  **In advance**
  - Readings. Bring questions.
  - Worksheet: Heterogeneity of effects – bring two copies to class (one to turn in at beginning).

  **In class**
  - Quiz 3. Work though worksheet and other examples. Lecture and discussion.

**10 Mar. 13**
- **Topic**: Group-level and Multi-level designs
- **Reading**: Szklo and Nieto. Chapter 1, section 1.3.
### Topic: Propensity scores

**Reading**

**Papers for in-class discussion (skim in advance):**

**In advance**
- Reading. Bring questions.

**In class**
- Quiz 4. Lecture and discussion on level of design. Also, time set aside for discussion of project protocol issues.

### Topic: Mediation analysis

**Reading**

**Optional:**

**In advance**
- Reading. Bring questions.

**In class**
- Lecture and discussion.
<table>
<thead>
<tr>
<th>Mar. 31</th>
<th>Assignment</th>
<th>Assignment 3 due on OWL by 5:00 pm.</th>
</tr>
</thead>
<tbody>
<tr>
<td>13 Apr. 3</td>
<td>Student presentations 1</td>
<td></td>
</tr>
<tr>
<td>14 Apr. 10</td>
<td>Student presentations 2</td>
<td></td>
</tr>
<tr>
<td>15 Apr. 21</td>
<td>FINAL ASSIGNMENTS DUE by 5:00 via OWL with two paper copies submitted to Dr. Bauer’s mailbox in K201.</td>
<td></td>
</tr>
</tbody>
</table>
IMPORTANT POLICY INFORMATION

Policy on Recording Classes
Classes may be audio-recorded with advance written instructor permission only (and verbal permission from classmates), and may not be video-recorded. Permission will not be granted for classes involving unpublished materials from the instructor or others.

Policy on Accommodation for Medical and Non-Medical Absences
For assignments worth 10% or more, refer to Western University’s Policy on Accommodation for Medical Illness: https://studentservices.uwo.ca/secure/index.cfm. For medical absences involving less than 10% of course grades, documentation may be required at the instructor’s discretion.

All non-medical absences must be approved in advance. In the case of an unexpected absence on compassionate grounds, documentation may be requested. If documentation is required by the instructor for either medical or non-medical academic accommodation, then such documentation must be submitted by the student directly to the appropriate Faculty Dean’s office and not to the instructor. It will be the Dean’s office that will determine if accommodation is warranted.

Statement on Academic Offences
Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence: http://www.uwo.ca/univsec/handbook/appeals/scholastic_discipline_undergrad.pdf

Support Services
As part of a successful student experience at Western, we encourage students to make their health and wellness a priority. Western provides several on campus health-related services to help you achieve optimum health and engage in healthy living while pursuing your degree. For example, to support physical activity, all students, as part of their registration, receive membership in Western’s Campus Recreation Centre. Numerous cultural events are offered throughout the year. Please check out the Faculty of Music web page http://www.music.uwo.ca/, and our own McIntosh Gallery http://www.mcintoshgallery.ca/. Information regarding health- and wellness-related services available to students may be found at http://www.health.uwo.ca/

Students seeking help regarding mental health concerns are advised to speak to someone they feel comfortable confiding in, such as their faculty supervisor, their program director (graduate chair), or other relevant administrators in their unit. Campus mental health resources may be found at http://www.health.uwo.ca/mental_health/resources.html

To help you learn more about mental health, Western has developed an interactive mental health learning module, found here: http://www.health.uwo.ca/mental_health/module.html. This module is 30 minutes in length and provides participants with a basic understanding of mental health issues and of available campus and community resources. Topics include stress, anxiety, depression, suicide and eating disorders. After successful completion of the module, participants receive a certificate confirming their participation.

Department & Faculty Offices
The Epidemiology & Biostatistics main office is located in K201 in the Kresge Building on Main campus.