

Department of Epidemiology and Biostatistics

Epidemiology 3110B/9521B

Multivariable Methods/Multivariable Methods in Biostatistics

Winter 2022

Lecture:

Tues, 10: 45am-11:45am, Zoom/MSB 148

Thur, 10:45am-11:45am Zoom/MSB 148

Instructor: GY Zou

Office Hours: By appointment

E-mail: gzou2@uwo.ca

Phone: X 86298

Lab:

9521B: Tuesdays 11:45am-12:30pm, MSB

148, **3110B:** Thursdays 11:45am-12:30pm

Course Information

This course is designed to provide students with a conceptual understanding of multivariable regression models most often encountered by epidemiologists and biostatisticians. These include multiple linear regression models for continuous outcomes, logistic regression models for binary outcomes, and Cox proportional hazard regression models for time-to-event data. Models will be discussed in the contexts of isolating the effect of a single predictor, understanding multiple predictors, and outcome predictions. Statistical methods for longitudinal studies are also covered. Data analysis in the course will be conducted primarily using Stata.

Prerequisite

3110B: Biostatistics 3100A, Epidemiology 3200A

9521B: Biostatistics 9509A or 9510A or equivalent

Undergraduate Policy: Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. 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.

Graduate Policy: Enrollment in this course is restricted to graduate students in the Department of Epidemiology and Biostatistics, as well as any student that has obtained special permission to enroll in this course from the course instructor as well as the Graduate Chair (or equivalent) from the student's home program.

Course Learning Outcomes/Objectives

Upon successful completion of this course, students will be able to:

- (i) understand and critique applications of regression models appearing in epidemiological and medical literature;
- (ii) understand the quantitative aspects of designs commonly seen in epidemiological and medical research;
- (iii) carry out analyses of epidemiological and medical studies using common statistical packages;
- (iv) interpret statistical analysis results;
- (v) communicate statistical results effectively.

Course Materials

Required: Vittinghoff, Glidden, Shiboski, McCulloch (2012) *Regression Methods in Biostatistics: Linear, Logistic, Survival, and Repeated Measures Models* (2nd ed). Springer. *PDF is available through Western library*

Additional materials will be provided on the course's OWL website.

Methods of Evaluation

- 40% - Bi-Weekly assignments.
- 10% - Lab assignments.
- 25% - Mid-term exam
- 25% - Final exam

Notes:

1. To pass the course, students must obtain an overall mark of 60%.
2. Late assignments without a valid documented reason (medical or bereavement) will be given a mark of zero (0).
3. For mid-term examination, calculators and one (1) page double-sided notes are allowed. Devices accessing internet access are not allowed.
4. For final exam, calculators and two (2) pages double-sided notes are allowed. However, computer and internet access are not allowed.

Course Timeline and Format

The format of this course is via Zoom till Jan 31, after that we follow the university guidelines.

Week	Date	Topic	Text Chapter *
1	1.11 1.13	<ul style="list-style-type: none"> Basic Statistical Methods Basic Statistical Methods 	3
		Lab 1	
2	1.18 1.20	<ul style="list-style-type: none"> Basic Statistical Methods Linear Regression 	3 4
		Lab 2, assignment 1	
3	1.25 1.27	<ul style="list-style-type: none"> Linear Regression Linear Regression 	4
		Lab 3	
4	2.1 2.3	<ul style="list-style-type: none"> Linear regression (cont) Linear regression 	4
		Lab 4, assignment 2	
5	2.8 2.10	<ul style="list-style-type: none"> Logistic regression Logistic regression 	5 5
		Lab 5	
6	2.15 2.17	<ul style="list-style-type: none"> Logistic regression Mid-term examination (online) 	5
		No lab	
Reading week			
7	3.1 3.3	<ul style="list-style-type: none"> Logistic regression Logistic regression 	5
		Lab 6	
8	3.8 3.10	<ul style="list-style-type: none"> Generalized linear models Generalized linear models 	8
		Lab 7, assignment 4	
9	3.15 3.17	<ul style="list-style-type: none"> Survival analysis Survival analysis 	6
		Lab 8	
10	3.22 3.24	<ul style="list-style-type: none"> Survival analysis Survival analysis 	6
		Lab 9, assignment 5	
11	3.29 3.31	<ul style="list-style-type: none"> Repeated measures and longitudinal data Repeated measures and longitudinal data 	7
		Lab 10	
12	4.5 4.7	<ul style="list-style-type: none"> Repeated measures and longitudinal data Repeated measures and longitudinal data 	7
		Lab 11	
Final exam	TBD		1-8

*Chapter numbers are referred to Vittinghoff et al. (2012).

Western Academic Policies and Statements

Absence from Course Commitments

Undergraduate Policy: [Policy on Academic Consideration for Student Absences](#)

If you are unable to meet a course requirement due to illness or other serious circumstances, you must seek approval for the absence as soon as possible. Approval can be granted either through a **self-reported absence or via the Academic Counselling unit**. Students have two self-reports to use throughout the academic year; absence from course commitments including tests, quizzes, presentations, labs, and assignments that are worth 30% or less can be self-reported. Self-reported absences cover a student for 48 hours (yesterday + today or today + tomorrow). Your instructor will receive notification of your consideration; however, you should contact your instructor immediately regarding your absence. Students are expected to submit missed work within 24 hours of the end of the 48-hour period. Please review Western's [Academic Consideration for Student Absences](#) policy for more details.

If you have used both their self-reported absences or will miss more than 48 hours of course requirements, a Student Medical Certificate (SMC) should be signed by a licensed medical or mental health practitioner and you should contact academic counselling. Academic Counselling will be operating virtually this year and can be contacted at scibmsac@uwo.ca.

Graduate Policy: 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 for either medical or non-medical academic accommodation, then such documentation must be submitted by the student to the instructor.

Special Examinations (Undergraduate Policy)

A Special Examination is any examination other than the regular examination, and it may be offered only with the permission of the Dean of the Faculty in which the student is registered, in consultation with the instructor and Department Chair. Permission to write a Special Examination may be given on the basis of compassionate or medical grounds with appropriate supporting documents. To provide an opportunity for students to recover from the circumstances resulting in a Special Examination, the University has implemented Special Examinations dates. These dates as well as other important information about examinations and academic standing can be found [here](#).

Statement on Academic Offences

Undergraduate Policy: Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf

Graduate Policy: Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_grad.pdf

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (<http://www.turnitin.com>).

Computer-marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

Copyright and Audio/Video Recording Statement

Course material produced by faculty is copyrighted and to reproduce this material for any purposes other than your own educational use contravenes Canadian Copyright Laws. You must always ask permission to record another individual and you should never share or distribute recordings.

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/>.

Registrarial Services: <http://www.registrar.uwo.ca>

USC Student Support Services: <http://westernusc.ca/services/>

Academic Support and Engagement: <http://academicsupport.uwo.ca/>

SGPS Life & Community web page: https://grad.uwo.ca/life_community/self/index.html

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 or Undergraduate Chair), or other relevant administrators in their unit. Health and Wellness-related information and services are available at <https://www.uwo.ca/health/>.

Students who are in emotional/mental distress should refer to Mental Health@Western <https://www.uwo.ca/health/> for a complete list of options about how to obtain help.

Accessible Education Western (AEW)

Western is committed to achieving barrier-free accessibility for all its members, including graduate students. As part of this commitment, Western provides a variety of services devoted to promoting, advocating, and accommodating persons with disabilities in their respective graduate program.

Graduate students with disabilities (for example, chronic illnesses, mental health conditions, mobility impairments) are strongly encouraged to register with Accessible Education Western (AEW), a confidential service designed to support graduate and undergraduate students through their academic program. With the appropriate documentation, the student will work with both AEW and their graduate programs (normally their Graduate Chair and/or Course instructor) to ensure that appropriate academic accommodations to program requirements are arranged. These accommodations include individual counselling, alternative formatted literature, accessible campus transportation, learning strategy instruction, writing exams and assistive technology instruction.

More information and access to services is available on the AEW website:
http://academicsupport.uwo.ca/accessible_education/index.html

Department & Faculty Offices

The Department of Epidemiology and Biostatistics is located on the third floor of the Western Centre for Public Health & Family Medicine (PHFM) on Western University's Main Campus.

Technology Requirements

You are responsible for all required course materials and announcements posted to the course's OWL website. Please ensure after the first class that when you log in you are able to access the course site. A copy of the course outline will be available on both OWL and the departmental website.