

## Department of Epidemiology and Biostatistics

### Epidemiology 9690R: Advanced Topics in Epidemiology & Biostatistics

**Time:** Wednesday, 11:00 am – 2:00 pm  
**Location:** Kresge Building, Room K116/K7

**Instructor:** Piotr Wilk  
**Office Hours:** By appointment  
**E-mail:** [pwilk3@uwo.ca](mailto:pwilk3@uwo.ca)  
**Phone Extension:** 89109

#### Course Information

The purpose of this seminar course is to familiarise students with basic structural equation modeling techniques. The course consists of a series of lectures and computer demonstrations covering the theory and practice of structural equation modeling with a focus on the practical application of these techniques to the analysis of cross-sectional and longitudinal health data.

#### Learning objectives

- Learn basic concepts of path analysis, confirmatory factor analysis, and structural equation modeling.
- Gain hands-on experience of working with health data using Mplus software.
- Be introduced to advanced statistical models for cross-sectional and longitudinal data.

#### Who should attend this course?

Graduate students interested in acquiring and applying advanced statistical modeling techniques in their research and work.

#### Prerequisites

Students are expected to have knowledge of simple and multiple linear regression models and categorical data analysis such as logistic regression models. Prior knowledge and experience using Mplus software is beneficial but not a requirement for this course.

## Course Syllabus

Week 1 (30 October): Introductions / Causal inference / Mplus modeling framework

Week 2 (6 November): Mediation / Path analysis [*Project: Outline*]

Week 3 (13 November): Measurement theory / Confirmatory factor analysis

Week 4 (20 November): Basic structural equation models

Week 5 (27 November): Life course epidemiology / Analysis of longitudinal data [*Project: Draft*]

Week 6 (4 December): Advanced structural equation models

16 December: [*Project: Final Submission*]

## Course Materials

There are no mandatory textbooks for this course. The weekly readings will be available from the instructor.

## Recommended Readings

Muthén BO and Muthén LK. 2019. *Mplus Statistical Analysis With Latent Variables: User's Guide*. Los Angeles, CA: Muthén & Muthén.

Kline RB. 2015. *Principles and Practice of Structural Equation Modeling*. New York, NY: The Guilford Press.

Byrne BM. 2011. *Structural Equation Modeling with Mplus: Basic Concepts, Applications, and Programming*. New York, NY: Routledge.

Muthén BO, Muthén LK, and Asparouhov T. 2016. *Regression and Mediation Analysis Using Mplus*. Los Angeles, CA: Muthén & Muthén.

Rothman KJ, Greenland S. 2005. "Causation and causal inference in epidemiology." *American Journal of Public Health*. Supplement 1, Vol. 95, No. S1.

Kuh D & Shlomo YB . 2002. "A life course approach to chronic disease epidemiology: conceptual models, empirical challenges and interdisciplinary perspectives." *International Journal of Epidemiology*, Vol. 31, No. 2, pp 285–293.

## Methods of Evaluation

Grades will be assigned on the basis of the pass/fail system.

- In-class presentation
- Group project

## Important Policy Information

### Policy on Prerequisites

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.

### 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>.

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.

### Policy on Recording Classes

Classes may not be audio-recorded without advance written permission from the instructor and other students, and may not be video-recorded. Permission will not be granted for classes involving unpublished materials from the instructor or others.

### 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/pdf/academic\\_policies/appeals/scholastic\\_discipline\\_undergrad.pdf](http://www.uwo.ca/univsec/pdf/academic_policies/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 or undergraduate 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](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](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.