Psy 510/610 Structural Equation Modeling
Syllabus Winter 2017

Instructor
Jason Newsom, Ph.D., Office: 317F Cramer Hall Center (3rd floor), Phone: 503-725-5136, Email: newsomj@pdx.edu. Office hours: Mondays 1:30-2:00 PM, Thursdays 11-noon, and by appointment. Website: http://web.pdx.edu/~newsomj

Meeting Times and Location
Class: Monday, 2:00 AM – 5:50 PM, Cramer Hall 369. Lab sessions will be held the last hour (from 4:50 – 5:50) in NH 448 for some class periods.

Text

Optional Text

Also Recommended (not in bookstore)


Prerequisites
I assume that students have taken a graduate statistics course that covers simple and multiple regression analysis, such as Psy 522/622.

Overview
This course is intended to introduce students to structural equation modeling. Structural equation modeling (sometimes referred to as covariance structural analysis) is a regression-based technique that incorporates elements of path analysis and confirmatory factor analysis. The general goal is to provide a thorough background in the conceptual aspects, statistical underpinnings, and application of this method rather than a tutorial on a specific software package. At the end of the course, I expect students to have a solid, conceptual foundation of structural modeling issues, be able to analyze data using any SEM package, critically evaluate professional articles, and write-up SEM results.

Readings and Commentaries (5%)
There will be several readings assigned each week taken from the text and supplemental sources. The readings will usually include an example article that applies SEM Please read the material prior to class and be prepared for discussion. Students will be required to turn in a one-page commentary on the readings for that week on each Monday by 10 am via email. The commentaries should be an informal set of questions, comments, or summary information (summarize only if you cannot think of anything else to say) about the articles. The purpose of the commentaries is to make sure the class is prepared for discussion and to help the instructor identify discussion topics and sources of confusion in the readings. I will assign 2 (complete and well-considered), 1 (did not read some/lacking effort), or 0 (did not read most/minimal effort/late/nothing) points to each, with one freebie.

Homeworks (95%)
There will be three homework assignments which will primarily consist of data analysis and write-ups of SEM problems using the demo version of the statistical program, Mplus (Muthen & Muthen,1998-2012), and the lavaan package in R. Mplus and lavaan have very simple syntax, allowing us to focus more on statistical and
applied issues rather than debugging programs or other software headaches. I will also provide some examples using Amos in class and discuss other software briefly. Some data preparation and descriptive analysis using SPSS or R may be required (let me know if this will be an inconvenience for some reason). The demo version of Mplus Version 7.4 can be downloaded from the following internet site: http://www.statmodel.com/demo.shtml. The demo version has no limitations on analysis types but allows no more than six dependent variables and two independent variables. R software is available at http://www.r-project.org/. Although you should not need it, the Mplus users guide can also be downloaded from the Mplus website (http://www.statmodel.com). The lavaan package is installed by running install.packages("lavaan", dependencies=TRUE) the command line. More information is available at http://lavaan.ugent.be/.

Homework due dates are: 2/13/17, 2/27/17, 3/20/17 (4 PM Mon finals week). Late assignments are not accepted without penalty (10% per day) unless there are extenuating circumstances, such as illness or family emergency. Please let me know if there are extenuating circumstances as early as possible.

Grades
Grades are based on an average of the three homework assignments (95%) and weekly commentaries (5%).

Other Resources
There are several internet sites devoted to SEM that may be of use. Dave Kenny has a great website with introductory material on most SEM topics at http://davidakenny.net/cm/causalm.htm (including a free pdf copy of his book, Correlation and Causation). Ed Rigdon has an excellent site that serves as a gateway to most of the SEM sites on the web at http://www.gsu.edu/~mkteer/. There is a SEM discussion list called SEMNET which you can subscribe to (I think it would be a great idea if everyone would subscribe during this term) through the following site http://www.gsu.edu/~mkteer/semnet.html. The Mplus website has lots of example programs and an Mplus discussion section http://www.statmodel.com/. Finally, I have compiled a list of hundreds of articles and books on SEM organized by topic at my website http://web.pdx.edu/~newsomj/.

Disabilities
If you have a disability and are in need of academic accommodations, please notify me immediately to arrange needed supports.
Course Readings
Psy 510/610 Structural Equation Modeling
Winter 2017


1/16 No class: Martin Luther King, Jr. Day

1/23 Overview and History of SEM and Matrix Algebra
Kline, Chapter 1, “Coming of Age”


1/30 Path Analysis
Kline, Chapter 6 “Specification of Observed-Variable (Path) Models” (except 138-141), Appendix 6.A.

Kline, Chapter 7 “Identification of Observed-Variable (Path) Models


2/6 Confirmatory Factor Analysis I: Theory, Model Fitting Concepts, and Software
Kline, Chapter 9, “Specification and Identification of Confirmatory Factor Analysis Models,” Appendix 9.A


2/13 Confirmatory Factor Analysis II: Model Comparisons and Fit indices
Kline Chapter 11, Estimation and Local Fit Testing (pp. 231-239 only)


Kline, Chapter 12, “Global Fit Testing”


2/20 Full Structural Models I: Practical Issues, Model Modifications, & Missing Data
Kline, Appendix 10.A


2/27 Full Structural Models II: Nonnormality & Categorical Variables


3/6 Multigroup Structural Models and Second-Order Factor Models
Kline, Chapter 16, “Multiple-Samples Analysis and Measurement Invariance”


Example article

3/13 Issues of Causality and Longitudinal Modeling


Optional chapter: Kline, Chapter 8, “Graph Theory and the Structural Causal Model”

3/20 (Finals Week) Growth Curve Models (readings only, no class meeting, no exam)
Kline, Chapter 15, “Mean Structures and Latent Growth Models”


Recommended additional readings
Kline, Chapter 18, “Best Practices in Structural Equation Modeling”

