The University of Texas at Austin School of Social Work

Structural Equation Modeling

Course Number:	SW 388R5	**Instructor:**	Kirk von Sternberg, Ph.D.
Unique Number:	61025	**Office:**	Hargis Hall 1.228
Semester:	Spring 2023	**Phone:** **Email:**	(512) 779-3313 cell vonsternberg@mail.utexas.edu
Meeting Time: **Place:**	SSW 2.118 Th. 8:30am-11:30am	**Office Hours:** **Place:**	Hargis Hall 1.228

I. Course Description

This course will introduce students to the basic concepts, applications, and programming of Structural Equation Modeling (SEM) using the AMOS program. Initially, students will learn to propose appropriate research questions for causal path analysis and SEM. Using an applied approach, the course will cover the two components of a structural equation model (i.e. measurement model and path analyses) using Maximum Likelihood Estimation. SEM procedures will be demonstrated through hands on application with actual data. The student will learn to work with latent and manifest variables with models incorporating mediation. The student will learn to conduct factor analysis, test causal structures, test model structure equivalence through multigroup analyses, examine direct and indirect path with mediation, and examine change over time with growth curve modeling. In addition, the student will learn acceptable methods for dealing with missing data, bootstrapping and Bayesian procedures.

II. Course Objectives

At the end of this course, students should:

1. Be able to formulate a research question appropriate for SEM analysis.
2. Be able to demonstrate an understanding of the effects of missing data and methods for handling missing data.
3. Be able to demonstrate an understanding of latent, manifest, moderating, and mediating variables.
4. Be able to test the factorial validity of a theoretical construct (First-order Confirmatory Factor Analysis – CFA)
5. Be able to test the factorial validity of scores from a measuring instrument for both a First-order CFA and a second-order CFA.
6. Be able to test the validity of a causal structure (Full SEM).
7. Be able to demonstrate factorial equivalence of scores from a measurement instrument using multigroup analysis in SEM.
8. Be able to test for mediation in a full SEM.
9. Be able to test for change over time with latent growth curve modeling using SEM.
10. Be able to express the purposes and use of bootstrapping and Bayesian procedures.

11. Be able to write a journal ready results section for a full causal SEM model.

III. Course Readings and Software

1. Required Text: Structural equation modeling with AMOS: basic concepts, applications, and programming. Barbara M. Byrne, 3rd edition**,** New York: Routledge, 2016.
http://catalog.lib.utexas.edu/search~S29?/abyrne/abyrne/1%2C472%2C1156%2CB/frameset&FF=abyrne+barbara+m&6%2C%2C8/indexsort=-

2. **Suggested Text:** Principles and practice of structural equation modeling. Rex B. Kline, 3rd edition, New York: Guilford Press, 2010.
http://catalog.lib.utexas.edu/search~S29?/akline%2C+rex/akline+rex/1%2C1%2C6%2CB/frameset&FF=akline+rex+b&5%2C%2C6/indexsort=-

3. **Software:** SPSS 24 and AMOS 24 (or above) - Most recent version is SPSS 26 and AMOS 26.

IV. Methods of Instruction

The methods of instruction will be informal lectures (questions and answers are encouraged), class discussions, computer exercises working with SPSS and AMOS data analytic software, class exercises, and guest presentations.

V. Grading

94.0 and Above	A
90.0 to 93.999	A-
87.0 to 89.999	B+
84.0 to 86.999	B
80.0 to 83.999	B-
77.0 to 79.999	C+
74.0 to 76.999	C
70.0 to 73.999	C-
67.0 to 69.999	D+
64.0 to 66.999	D
60.0 to 63.999	D-
Below 60.0	F

The final grade for the course will be based on:

1. Class assignments	72 points
2. Quizzes	9 points
3. Results Section	15 points
4. Class Participation	4 point
	100 points

VI. Course Requirements and Grade Assignment

1. Class Assignments (**72 points**): Class assignments will be completed during class or as take home assignments. They will include assignments to determine student's mastery of concepts as well as mastery of methods of analysis. There will be **6** class assignments which will be worth 12 points each for a total of **72 points**.
    1) CFA – first order CFA
    2) CFA – second-order CFA
    3) Testing validity of a causal structure
    4) Testing the structural equivalence of a measurement model
    5) Testing mediation in a causal model
    6) Testing a growth curve model

2. Short Quizzes or assignments **(9 points)** will be given at the instructor's discretion to help inform the student and the instructor about the level of understanding and the pace of the course. There will be 4 quizzes. The instructor will drop the lowest grade such that there will be 3 quizzes counted at 3 points each for a total of 9 points.

3. Results Section: **(15 points)** The student will write a journal ready results section for an assigned SEM.

4. Class participation: **(4 points)** Students will be awarded 0-4 points at the instructor's discretion for his/her participation in the class over the semester.

VII. Class Policies

***Remember that as a Ph.D. student, you are ultimately responsible for your own learning and development. The professor is there to support and facilitate your learning, but you need to take the initiative for your own education.

1. Students are expected to attend class sessions and participate in an **interactive** framework with the professor. Students are expected to **complete the readings prior to class** and should be well prepared to participate in discussions. Failure to regularly attend classes and demonstrate through discussions that one has kept up with the readings will be considered in the final grade. Students are to notify the professor if they are going to be absent. Students are responsible for any material missed due to absences.

2. Except in the case of extreme emergencies, and then only with the permission of the professor, **late assignments will not be accepted.** Students are expected to email all required assignments on the night before the due date. Assignments turned in after the 10:00 P.M. deadline (the night before the class) will be considered late. If assignments are accepted late, they will be assessed point penalties at the rate of **5% each day they are late.** If students have conflicts with due dates, they should see the professor and negotiate another due date WELL in advance of the original due date. Note that the

professor will send a reply email when the assignment is received; if you do not get a reply, contact the professor immediately. Email is great, but not ALWAYS reliable!

3. Student feedback is welcome. During this course the professor will ask students to provide feedback on their learning in informal as well as formal ways, including through anonymous surveys about how the professor's teaching strategies are helping or hindering student learning. It is very important for the professor to know the students' reactions to what is taking place in class, so students are encouraged to respond to these surveys, ensuring that the professor and students together can create an environment effective for teaching and learning.

4. Students are also encouraged to provide feedback during office hours, by phone, by e-mail, and by appointment, if they desire.

5. If students are concerned about their class performance, the professor and his TA are more than willing to work with students to help improve their course grades prior to the end of the semester. **Final grades assigned in the course are not negotiable.**

Use of Canvas in Class
In this class the professor uses Canvas—a Web-based course management system with password-protected access at http://courses.utexas.edu—to distribute course materials, to post grades, to submit assignments, and to give students online quizzes and surveys. Students can find support in using Canvas at the ITS Help Desk by calling 475-9400, Monday through Friday, 8 a.m. to 6 p.m. Please plan accordingly.

VIII. UNIVERSITY POLICIES

COVID-19 RELATED INFORMATION. The University's policies and practices related to the pandemic may be accessed at: https://protect.utexas.edu/

THE UNIVERSITY OF TEXAS HONOR CODE. The core values of The University of Texas at Austin are learning, discovery, freedom, leadership, individual opportunity, and responsibility. Each member of the university is expected to uphold these values through integrity, honesty, trust, fairness, and respect toward peers and community.

DISABILITY ACCOMODATION STATEMENT. If you are a student with a disability, or think you may have a disability, and need accommodations please contact Disability and Access (D&A). You may refer to D&A's website for contact and more information: http://diversity.utexas.edu/disability/ . If you are already registered with D&A, please deliver your Accommodation Letter to me as early as possible in the semester so we can discuss your approved accommodations and how they apply in my class.

PROFESSIONAL CONDUCT AND CIVILITY IN THE CLASSROOM. The professor expects students to act as professionals in class. This means students should arrive on time for class, be prepared to participate in the class discussion, and show respect for one another's

opinions. A course brings together a group of diverse individuals with various backgrounds. Students are influenced and shaped by such factors as race, ethnicity, gender, sex, physical abilities, religious and political beliefs, national origins, and sexual orientations, among others. We expect to learn from each other in an atmosphere of positive engagement and mutual respect. This atmosphere includes working intentionally to recognize and dismantle racism, sexism, heterosexism, and ableism in the classroom. Social Work also deals with complex and controversial issues. These issues may be challenging and uncomfortable, and it would be impossible to offer a substantive classroom experience that did not include potentially difficult conversations relating to challenging issues. In this environment, we will be exposed to diverse ideas and opinions, and sometimes we will not agree with the ideas expressed by others. Nevertheless, the professor requires that students engage one another with civility, respect, and professionalism.

UNANTICIPATED DISTRESS. Students may experience unexpected and/or distressing reactions to course readings, videos, conversations, and assignments. If so, students are encouraged to inform the professor. The professor can be responsive and supportive regarding students' participation in course assignments and activities, but students are responsible for communicating clearly what kind of support is desired. If counseling is needed, students may contact a service provider of their choosing, including the UT Counseling Center at 512-471-3515 or online at https://cmhc.utexas.edu/.

POLICY ON SOCIAL MEDIA AND PROFESSIONAL COMMUNICATION. Public social networks are not private. Even when open only to approved or invited members, users cannot be certain that privacy will exist among the general membership of sites. If social work students choose to participate in such forums, please assume that anything posted can be seen, read, and critiqued. What is said, posted, linked to, commented on, uploaded, subscribed to, etc., can be accessed and archived, posing potential harm to professional reputations and prospective careers.

Social work students who use social media (e.g. Facebook, Twitter, Instagram) and other forms of electronic communication (e.g. blogs) must be mindful of how their communication may be perceived by clients, colleagues, faculty, and others. Social work students are expected to make every effort to minimize material which could be considered inappropriate for a professional social worker in training. Because of this, social work students are advised to manage security settings at their most private levels and avoid posting information/photos or using any language that could jeopardize their professional image.

Students are asked to consider the amount of personal information posted on these sites and are obliged to block any client access to involvement in the students' social networks. Client material should not be referred to in any form of electronic media, including *any* information that might lead to the identification of a client or compromise client confidentiality in *any* way. Additionally, students must critically evaluate any material that is posted regarding community agencies and professional relationships, as certain material could violate the standards set by the School of Social Work, the Texas Code of Conduct for Social Workers, and/or the NASW Code of Ethics.

Social work students should consider that they will be representing professional social work practice as well as The University of Texas at Austin School of Social Work program while in the classroom, the university community, and the broader area communities.

POLICY ON ACADEMIC INTEGRITY. Students who violate University rules on academic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and / or dismissal from the University. Since such dishonesty harms the individual, all students, and the integrity of the University, policies on academic dishonesty will be strictly enforced. For further information, please visit the Student Conduct and Academic Integrity website at: http://deanofstudents.utexas.edu/conduct.

USE OF COURSE MATERIALS. The materials used in this course, including, but not limited to exams, quizzes, and homework assignments, are copyright protected works. Any unauthorized duplication of the course materials is a violation of federal law and may result in disciplinary action being taken against the student. Additionally, the sharing of course materials without the specific, express approval of the professor may be a violation of the University's Student Honor Code and an act of academic dishonesty, which could result in further disciplinary action. This sharing includes, among other things, uploading class materials to websites for the purpose of distributing those materials to other current or future students.

CLASSROOM CONFIDENTIALITY. Information shared in class about agencies, clients, and personal matters is considered confidential per the NASW Code of Ethics on educational supervision and is protected by regulations of the Family Educational Rights and Privacy Act (FERPA) as well. As such, sharing this information with individuals outside of the educational context is not permitted. Violations of confidentiality could result in actions taken according to the policies and procedure for review of academic performance located in sections 3.0, 3.1, and 3.2 of the Standards for Social Work Education.

UNIVERSITY ELECTRONIC MAIL STUDENT NOTIFICATION. Electronic mail (email), like postal mail, is a mechanism for official University communication to students. The University will exercise the right to send email communications to all students, and the University will expect that email communications will be received and read in a timely manner.Students can find UT Austin's policies and instructions for updating their e-mail address at https://it.utexas.edu/policies/university-electronic-mail-student-notification-policy.

RELIGIOUS HOLY DAYS. A student who misses classes or other required activities, including examinations, for the observance of a religious holy day should inform the instructor as far in advance of the absence as possible so that arrangements can be made to complete an assignment within a reasonable period after the absence. A reasonable accommodation does not include substantial modification to academic standards, or adjustments of requirements essential to any program of instruction. Students and instructors who have questions or concerns about academic accommodations for religious observance or religious beliefs may contact the Office for Inclusion and Equity. The University does not maintain a list of religious holy days.
TITLE IX REPORTING. In accordance with Title IX of the Education Amendments of 1972, the University of Texas at Austin is committed to maintaining a learning environment that is free from discriminatory conduct on the basis of sex https://titleix.utexas.edu/. Faculty, field

instructors, staff, and/or teaching assistants in their supervisory roles are mandated reporters of incidents of sex discrimination, sexual harassment, sexual violence, stalking, dating violence, or any other forms of sexual misconduct. Students who report such incidents will be informed of University resources. Incidents will be reported to the University's Title IX Coordinator. Further information, including student resources related to Title IX, may also be found at https://titleix.utexas.edu/.

CAMPUS CARRY POLICY. The University's policy on campus carry may be found here: https://campuscarry.utexas.edu.

SAFETY. As part of professional social work education, students may have assignments that involve working in agency settings and/or the community. As such, these assignments may present some risks. Sound choices and caution may lower risks inherent to the profession. It is the student's responsibility to be aware of and adhere to policies and practices related to agency and/or community safety. Students should notify the professor regarding any safety concerns.

BEHAVIOR CONCERNS and COVID-19 ADVICE LINE (BCCAL). If students have concerns about their behavioral health, or if they are concerned about the behavioral health of someone else, students may use the Behavior Concerns and COVID-19 Advice Line to discuss by phone their concerns. This service is provided through a partnership between the Office of the Dean of Students, the Counseling and Mental Health Center (CMHC), the Employee Assistance Program (EAP), and The University of Texas Police Department (UTPD). Call 512-232-5050 or visit https://safety.utexas.edu/behavior-concerns-advice-line. The Behavior Concerns and COVID-19 Advice Line has been expanded to support The University of Texas at Austin community during the COVID-19 pandemic. By calling 512-232-5050 - Option 2 for COVID-19, students, faculty and staff can be assisted in English and Spanish with COVID-19 support.

EMERGENCY EVACUATION POLICY. Occupants of buildings on the UT Austin campus are required to evacuate and assemble outside when a fire alarm is activated or an announcement is made. Please be aware of the following policies regarding evacuation:

- Familiarize yourself with all exit doors in the classroom and the building. Remember that the nearest exit door may not be the one you used when entering the building.
- If you require assistance to evacuate, inform the professor in writing during the first week of class.
- In the event of an evacuation, follow the professor's instructions.
- Do not re-enter a building unless you are given instructions by the Austin Fire Department, the UT Austin Police Department, or the Fire Prevention Services office.

GRADING SCALE

94.0 and Above	A
90.0 to 93.999	A-
87.0 to 89.999	B+
84.0 to 86.999	B
80.0 to 83.999	B-
77.0 to 79.999	C+

74.0 to 76.999	C
70.0 to 73.999	C-
67.0 to 69.999	D+
64.0 to 66.999	D
60.0 to 63.999	D-
Below 60.0	F

IX. Class Schedule

Date	Description	Assignments
Jan 12	Introduction to Course Review Syllabus and texts Introduce Project CHOICES assessments and databases	**Read Byrne Chapter 1 SEM:** The Basics
Jan 19	Fundamental Concepts Multiple Regression review Mediation and Moderation Direct and Indirect paths Formulating research questions for SEM	***In Class:*** Formulate research questions for SEM **Read Byrne Chapter 2 SEM**: Using The AMOS Program
Jan 26	Introduction to SEM Using AMOS	***In Class:*** Draw general structural equation models **Read Byrne Chapter 3&4 SEM**: First order CFA
Feb 2	Measurement Model First-order CFA	***In Class***: Draw first-order CFA for measuring instrument **ASSIGNMENT 1**: Conduct first-order CFA on measurement instrument. **Read Byrne Chapter 5 SEM**: Second-order CFA
Feb 9	**Assignment 1 Due:** First-order CFA Measurement Model Second-order CFA	**ASSIGNMENT 2**: Test Second Order CFA Model.
Feb 16	**Assignment 2 Due:** Second-order CFA Review Basics Model identification	**Read Byrne Chapter 6 SEM**: Testing Validity of a Causal Structure

Feb 23	Testing Validity of a Causal Structure	**ASSIGNMENT 3**: Test Validity of a Causal Structure
Mar 2	**Assignment 3 Due:** Causal Structure Writing Results and Presenting Data	**RESULTS SECTION ASSIGNMENT:** Write results Section for causal structure analyses **Read Byrne Chapter 7 SEM**: Testing for Measurement Invariance in Multigroup Analyses
Mar 9	**Results Section Due** Testing the STRUCTURAL equivalence of measurement models in multigroup analyses	**ASSIGNMENT 4:** Multigroup Invariance Testing
Mar 16	**SPRING BREAK**	
Mar 23	**Assignment 4 Due:** Multigroup Invariance Testing Review and work on multigroup assignment	**Read Handout**: Testing mediation in a causal model **Read Byrne Chapter 11 SEM:** Testing for change over time; the Latent Growth Curve model
Mar 30	The Growth Curve model	**ASSIGNMENT 6:** Growth Curve model **Read Byrne Chapter 12 SEM:** Bootstrapping as an aid to nonnormal data
Apr 6	The Growth Curve model, continued? Bootstrapping	
Apr 13	**Assignment 5 Due:** Growth Curve Model Mediation in SEM	**ASSIGNMENT 6:** Testing mediation in a causal model **Read Handout**: van de Schoot, et. al., 2014
Apr 20	**Assignment 6 Due**: Testing mediation in a causal model Missing data Intro to Bayesian method Evaluation of course	***In Class:*** Activity related to bootstrapping

* Required readings: journal articles and other materials may be assigned throughout the semester. The instructor will provide these readings to the class.

X. Course and Instructor Evaluations

At the end of the course, I will use the standard Course Instructor Survey (CIS) provided by the University of Texas at Austin. The CIS offers students a systematic, campus-wide method of evaluating courses and instructors. It also allows instructors to compare their course ratings with averages for their school. The results are also used by the Dean and the School's Executive Committee as one of the aspects of faculty and course evaluation. I hope that every student will complete the CIS. Although important, these evaluations are after the fact. I strongly encourage you to provide input and feedback regarding the course during the semester so that we can together make this course of maximum benefit to your academic pursuit.

XI. Bibliography

Byrne, B.M. (2016) Structural equation modeling with AMOS: basic concepts, applications, and programming. 3rd edition**,** New York: Routledge, 2016.

Curran, P.J., Obeidat, K., Losardo, D. (2010) Twelve frequently asked questions about growth curve modeling. *Journal of Cognitive Development 11*(2): 121–136

Kline, R.B. (2010) Principles and practice of structural equation modeling. 3rd edition, New York: Guilford Press, 2010.
Sandberg, J. & Alvesson, M. (2011). Ways of constructing research questions: gap-spotting or problematization? *Organization, 18*(1) 23–44.

Shreiber, J.B., Stage, F.K., King, J., Nora, A., Barlow, E.A. (2006). Reporting structural equation modeling and confirmatory factor analysis results: A review. *The Journal of Educational Research 99*(6), 323-337.

Structural Equation Modelling: Guidelines for Determining Model Fit. Daire Hooper, et al. 2008.

Van de Schoot, R., Kkaplan, D., Denissen, J, Asendorpf, J., Neyer, F.J., van Aaken, M.A.G. A gentle introduction to Bayesian Analysis: Applications to developmental research. *Child Development*, *85*(3), 842–860