**EDF 7931 – ADVANCED TOPICS IN STRUCTURAL EQUATION MODELING**
**Spring – 2009**
**Section: 4039**

***Time:***
Thursdays 4:05 – 7:05 pm *Room:* Norman 219


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|---|---|
| *Professor:* Dr. Walter Leite, Ph.D.<br>*Office:* Norman Hall 119E<br>*Phone:* 352-2734302<br>*E-mail:* walter.leite@coe.ufl.edu | ***Office Hours:***<br>Tuesdays 2:00 – 5:00 pm<br>Or by appointment |


**Class webpage in WEBCT: lss.at.ufl.edu**
The class webpage contains the syllabus, readings, grades, datasets, and class handouts

**Course Description:** This course addresses structural equation models that are typically not covered in an introduction to structural equation modeling class, as well as methods of methodological research about structural equation modeling. This course will meet once a week for 3 hours, during 15 weeks.
**Objectives:** To familiarize students with the equations, estimation, assumptions and applications of advanced structural equation models; To familiarize students with the methodology of research about structural equation models.
**Outcomes:** Students completing the course will be able to use advanced structural equation models to analyze data, understand methodological research about structural equation models, and plan and execute methodological studies about structural equation models.
**Method of instruction:** This advanced course will be delivered with a combination of lectures, student discussion, student presentations, and computer-related classroom activities. It is expected that students read the assigned book chapter and articles in advance of each meeting and are prepared to discuss the readings.

**Course Requirements**

***Homework exercises:*** Several homework exercises will be assigned and should be submitted to the instructor at the beginning of the next class day. Homework should be printed. Late homework is not accepted unless special arrangements are made in advance with the instructor.

**Student presentation:** Each student will make a presentation related to a topic discussed in class. The presentation consists of a literature review of five articles published between 2004 and 2009 about one of the models addressed in class. The presentation should provide the contribution of each paper, how the papers connect with previous research and with each other, a critical review of the limitation of each paper, and a description of unanswered research questions in the field addressed by the papers. The presenter should prepare a written document containing the literature review in a format appropriate for an academic paper, as well as a Powerpoint presentation. Each presenter will have 30 minutes to deliver the presentation, which will be followed by discussion. The presenter should e-mail the text of the literature review to the classmates one day in advance of the presentation, and provide printed handouts of the powerpoint slides at the day of the presentation.

**Methodological Paper:** The methodological paper should be completed with a partner or individually. It should take the form of a research proposal that addresses one or more methodological questions, but it does not need to contain complete results. The paper should be related to methods discussed in class. The paper should have a minimum of 15 pages (double spaced) excluding references, tables and graphs. The students working on a paper may use content of their own presentations in the paper, but the literature review of the paper should provide a strong argument for the importance of the proposal's research questions. The paper should be in APA style and a reference management software should be used to create the reference list. Refworks, which is provided by the University of Florida Libraries, is recommended.

Students are expected to turn in an abstract of the paper on 3/25/10 BY E-MAIL. The abstract should describe the objectives of the study, the

research problem it addresses and its importance. The abstract should have a maximum of 250 words.

The parts of the methodological paper that students are expected to write are provided bellow. Students will be evaluated with respect to whether they successfully develop all parts of the paper.

**Methodological paper**

Introduction

1. Identify the field.
2. Identify the current relevance of the field/theory.
3. Identify the problem(s) being addressed.
4. Describe importance of the problem(s).

Literature Review

1. Present the major concepts and publications about the problem..
2. Present and discuss the findings of research studies addressing the problem and related problem.
3. Present how the issue has been dealt with in applied studies.
4. Define specific research questions.
5. Summarize what the study aims to accomplish.

Methods

Provide a description of the study design. Methods sections of a simulation study should contain a description of factors being manipulated and levels of factors, a justification for the choice of factors and levels, a description of the outcomes, a description of the data simulation procedure, a description of the method of analysis of the simulated data and the criteria used to evaluate results.

Preliminary Results

Results from a subset of conditions or, if possible, complete conditions.

**Participation:** The students will be evaluated with respect to their level of engagement in classroom discussion

| ***Assessment*** | ***weight*** |
|---|---|
| Homework assignments | 20% |
| Presentation | 30% |
| Paper | 40% |
| Participation | 10% |

**Course Grades**

**Final grades will be assigned based on the scale below:**

| *Overall course percent* | *grade* |
|---|---|
| 93.0% - 100% | A |
| 90.0% - 92.9% | A- |
| 87.0% - 89.9% | B+ |
| 83.0% - 86.9% | B |
| 80.0% - 82.9% | B- |
| 77.0% - 79.9% | C+ |
| 73.0% - 76.9% | C |
| 70.0% - 72.9% | C- |
| 67.0% - 69.9% | D+ |
| 63.0% - 66.9% | D |
| 60.0% - 62.9% | D- |
| 59.9% or less | E |

Unless a computational error has been made, grades will not be changed after the end of the semester.

**Class Attendance:** As a matter of mutual courtesy, please let the instructor know when you're going to be late, when you're going to miss class, or if you need to leave early.

**Academic dishonesty:** Written assignments will be checked for plagiarism against published works, other papers submitted by classmates at the current and previous semesters and internet pages using Turnitin, which is UF's plagiarism detection software. It is expected that submitted work will solely reflect the students' own efforts.

**Accommodations for Students with Disabilities:** If you require classroom accommodation because of a disability, you must first register with the Dean of Students Office (http://oss.ufl.edu/). The Dean of Students Office will provide documentation to you, which you then give to the instructor when requesting accommodation. The College is committed to providing reasonable accommodations to assist students in their coursework.

**Required Book**

Hancock, Gregory R. & Mueller, Ralph O. (Eds.) (2006). Structural equation modeling: A second course. Greenwich, CT: Information Age Publishing.

**Articles available in the class website:**


Algina, J., & Moulder, B. C. (2001). A note on estimating the Jöreskog-Yang model for latent variable interaction using LISREL 8.3. *Structural Equation Modeling, 8*, 40.

Bauer, D. J. (2007). Observations on the use of growth mixture models in psychological research. *Multivariate Behavioral Research, 42*, 757–786.

Biesanz, J. C., Deeb-Sossa, N., Papadakis, A. A., Bollen, K. A., & Curran, P. J. (2004). The role of coding time in estimating and interpreting growth curve models. *Psychological Methods, 9*, 30-52.

Blozis, S. A., & Cho, Y. I. (2008). Coding and centering of time in latent curve models in the presence of interindividual time heterogeneity. *Structural Equation Modeling, 15*, 413 - 433.

Hahs-Vaughn, D. L., & Lomax, R. G. (2006). Utilization of Sample Weights in Single-Level Structural Equation Modeling. *Journal of Experimental Education, 74*, 163-190.

Leite, W. L., & Zuo, Y. (Unpublished Manuscript). Modeling Latent Interactions at Level Two in Multilevel Structural Equation Models: An Evaluation of Mean-centered and Residual-centered Unconstrained Approaches: University of Florida.

Marsh, H. W., Wen, Z., & Hau, K.-T. (2004). Structural equation models of latent interactions: Evaluation of alternative estimation strategies and indicator construction. *Psychological Methods, 9*, 275-300.

Marsh, H. W., Wen, Z., Hau, K.-T., Little, T. D., Bovaird, J. A., & Widaman, K. F. (2007). Unconstrained structural equation models of latent interactions: Contrasting residual- and mean-centered approaches. *Structural Equation Modeling, 14*, 570-580.

Mehta, P. D., & Neale, M. C. (2005). People Are Variables Too: Multilevel Structural Equations Modeling. *Psychological Methods, 10*, 259-284.

Muthén, B. O. (1994). Multilevel covariance structure analysis. *Sociological Methods and Research, 22*, 376 - 399.

Nylund, K. L., Asparouhov, T., & Muthén, B. O. (2007). Deciding on the Number of Classes in Latent Class Analysis and Growth Mixture Modeling: A Monte Carlo Simulation Study. *Structural Equation Modeling, 14*, 535-569.

Paxton, P., Curran, P. J., Bollen, K. A., Kirby, J., & Chen, F. (2001). Monte Carlo experiments: Design and implementation. *Structural Equation Modeling, 8*, 287-312.

R Development Core Team. (2009). *An Introduction to R*. from http://cran.r-project.org/doc/manuals/R-lang.pdf

Stapleton, L. M. (2002). The Incorporation of sample weights into multilevel structural equation models. *Structural Equation Modeling, 9*, 475 - 503.

Stapleton, L. M. (2006). An assessment of practical solutions for structural equation modeling with complex sample data. *Structural Equation Modeling, 13*, 28-58.

Stapleton, L. M. (2008). Variance Estimation Using Replication Methods in Structural Equation Modeling With Complex Sample Data. *Structural Equation Modeling, 15*, 183-210.

Underhill, J., Leite, W. L., & Zhang, O. (Unpublished manuscript). The specification of growth trajectories in growth mixture models: A review of current practices and Monte Carlo study (pp. 1-43): University of Florida.

Voelkle, M. C. (2008). Reconsidering the use of autoregressive latent trajectory (ALT) models. *Multivariate Behavioral Research, 43*, 564-591.

Wang, L., Zhang, Z., McArdle, J. J., & Salthouse, T. A. (2008). Investigating ceiling effects in longitudinal data analysis. *Multivariate Behavioral Research, 43*, 476-496.

**Topics and Readings**
**(In the order they will be studied)**

**Monte Carlo studies in SEM** –
1/7 - Introduction
1/14 - Chapter 12 of required book; Articles: Paxton, Curran, Bollen, Kirby and Chen (2001)
1/21 – R Development Core Team (2009)

**Multilevel SEM** –
1/28 - Chapter 11 of required book; Articles: Muthén (1994);
2/4 - Mehta and Neale (2005)
Presentation 1. Student presentation about multilevel SEM

**Latent interactions and quadratic terms in SEM**
2/11 - Chapter 8 of Required book; Articles: Algina and Moulder (2001), Marsh, Wen and Hau (2004),
Presentation 2. Student presentation about latent interactions
2/18– Marsh et al. (2007), Leite and Zuo (Unpublished Manuscript)
Presentation 3. Student presentation about latent interactions

**Mixture SEM** –
2/25- Chapter 7 of required book;
Factor mixture models: Leite and Cooper (in press)
Presentation 4. Student presentation about mixture SEM

3/4- Growth mixture models – Bauer (2007), Underhill, Leite and Zhang (Unpublished manuscript)
Model section: Nylund, Asparouhov and Muthén (2007)
Presentation 5. Student presentation about Growth mixture models

**Advanced Latent Growth Models**
3/18 - Chapter 6 of Required book
Presentation 6. Student presentations about latent growth models
**3/25 - Coding of time:** Biesanz, Deeb-Sossa, Papadakis, Bollen and Curran (2004), Blozis and Cho (2008)
Presentation 7. Student presentation about latent growth models

**4/1- Ceiling effects:** Wang, Zhang, McArdle and Salthouse (2008)
**Autoregressive effects:** Voelkle (2008)

**SEM of Complex Sampling Designs**

4/8 - Hahs-Vaughn and Lomax (2006), Stapleton (2002)

4/15 - Stapleton (2006; , 2008)

4/26 BY 12 PM - METHODOLOGICAL PAPER DUE

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