Psychology 319 – Advanced Structural Equation Modeling (Graduate)

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Course Meeting Times:	W 110-400 Hobbs 107
Instructor Website:	http://www.statpower.net All course materials, including a detailed schedule of readings and class assignment by day, are available for downloading at this website.
Course Objectives	The objective of this course is to provide students with a firm background in modern structural equation modeling techniques. Planned topics include: • The conceptual and statistical foundations of structural equation modeling: Covariance Algebra, Factor Analysis, Component Analysis. and Confirmatory Factor Analysis • Setting up a basic model in LISREL, MPLUS, and R • Is your model identified? • Does your model have an empirically equivalent twin with substantially different implications? • Do you have enough power? Is your sample size large enough? (Are the two questions equivalent?) • Dealing with missing data • Dealing with outliers • How does a SEM program actually work? Should you care? • What can you do if your model estimation does not converge? • Analyzing model fit • Models for independent groups representing separate populations • Models with categorical and/or continuous normal and non-normal manifest variables • Models with interaction effects • Models with nonlinear constraints • Fitting Standardized Models – the right way and the wrong way • Latent Growth Curve Models • Correlation Structure Models • Simulation research in SEM
Required Textbook:	No required textbook. Readings from various textbook chapters and articles will be provided. It is essential that you read the assigned reading prior to class, as discussion will center on the readings. Understanding will be greatly enhanced by adhering to this policy (as will your grades!). Occasionally the text will be supplemented by other readings provided by the instructor.
Software:	In addition to the commercial SEM programs MPlus and LISREL, the freeware statistical program R will be used throughtout the course, in the classroom, in laboratory exercises, on homework assignments, and in exams.
Prerequisites:	There are no official prerequisites for the course, but an introductory course in applied statistics at the graduate level is strongly recommended, and courses in multivariate analysis, factor analysis, introductory structural equation modeling, or correlation and regression will prove useful.

Grading:	Homework 85% There are homework assignments throughout the course. These are deep and time-consuming, and go beyond the kind of superficial coverage we can achieve in an examination format. These exercises develop extensive competence in R programming to generate both statistical and graphical analysis.
	Class Project Paper and Presentation 15%
	Grading Standards
	90–100 A excellent 86–89 A– superior 83–85 B+ strongly competent 80–82 B competent 76–80 B– competent 70–75 C+ adequate 66–70 C adequate 61–65 C– adequate 57–60 D+ marginally adequate 54–56 D inadequate 50–53 D– barely passing 00–49 F failing
Analysis Project and Class Presentation:	A class during the final week will be reserved for original conference-style presentations by each student. I have a number of project topics from which you may choose, but original ideas are strongly encouraged. You will be asked to turn in a project proposal by Week 12, so be sure to present your ideas to me informally before then. Your grade on the final project will depend on the quality of your work, the quality of your presentation and your slides, and the difficulty of your chosen topic. More information on the project requirements will be given later in the semester.
Honor Code:	Your presence here presupposes a commitment to principles of academic honesty, integrity, and responsible citizenship. Consult the University Student Handbook regarding academic misconduct. You are encouraged to work together on computer code, but interpretations and write-ups must be your own. Continued enrollment in this course assumes tacit agreement with this policy. The Honor Code is defined in Vanderbilt University Student Handbook: http://studentorgs.vanderbilt.edu/HonorCouncil/ Please abide by the Honor Code. Academic misconduct will be dealt with through official channels. I encourage you to study and discuss topics with your fellow students, but all submitted work should reflect only your own knowledge and understanding of the subject matter, not your fellow students, unless a team project is explicitly authorized. If there is any doubt whatsoever about what actions constitute infractions of the honor code, please discuss the issue with the course instructor.
Disabilities:	If you are (or become) learning, sensory, or physically disabled, and feel that you need special assistance in lecture, reading, testing, or any other work in this course, please contact me to discuss your specific needs as soon as possible.

How to Succeed in This Course

Attend Lecture Regularly:	Attendance at all lectures is strongly encouraged. This course relies heavily on cumulative information, and your success will depend heavily on your ability to keep up.
Use Office Hours:	I cannot recommend strongly enough that you use office hours. This is a way for you to get one-on-one clarification of any questions or problems that you might have.
Work with Others:	Study groups can be very useful. I encourage you to work together to master difficult concepts and use nonparametric statistics software.
Ask Questions:	If you have a question about something, I guarantee that at least one other person has the same question. Ask questions in class. Ask questions in office hours. Ask me over e-mail. Use the resources that are available to you.
Be Inclusive and Supportive:	This introductory course welcomes students with a rich variety of backgrounds. Over the years, we have found that students who arrive with a superior skill set profit immensely by sharing their knowledge. The act of sharing and teaching others helps reinforce your own knowledge, while alerting you to new ways of thinking about the subject matter. Students who start the course with less than the typical background generally find that their experience is enhanced by networking with other students. Let's celebrate our differences, and support each other with an atmosphere of mutual respect and inclusiveness.