Instructor: Dr. Audhesh Paswan
Phone: 940-565-3121
e-mail: paswana@unt.edu
Office: BLB 201A
Office Hrs: MT –12:00 Noon -2:00 PM or by appointment

TEXTBOOKS:
Required: Structural Equation Modeling with LISREL, PRELIS, and SIMPLIS
Barbara Byrne, Lawrence Erlbaum Associates.

SUGGESTED REFERENCES:

Textbooks:
Joreskog, K., and Sorbom, J. LISREL 8: Structural equation modeling with the Simplis command language, Lawrence Erlbaum Associates, Hillsdale, NJ.1993
Hair, Anderson, Tatham, and Black, A Multivariate Data Analysis, Prentice Hall.

Theory and Constructs, the Base Material:
SEM Initial Material:


Examples of Studies Using SEM to Test a Theory-Based Model:


Nested Models, Model Specification, Fit Estimation:


Williams, Larry J. and Holahan, Patricia J. (1994), "Parsimony-Based Fit Indices for Multiple-Indicator Models: Do They Work?" *Structural Equation Modeling*, 1, 2, 161-189.


Using Covariance Structure Modeling to Assess Measures of Latent Constructs:


New development:


**COURSE DESCRIPTION**

This course will emphasize the application of covariance structural modeling techniques to the analysis of behavioral data in business research. Course will provide "hands-on" practice using LISREL to examine measurement and structural models containing directly observed and latent variables. Course will provide
students with a solid working knowledge of how to conceptualize measurement and structural models, the standard LISREL and SIMPLIS syntax for estimating these models, and proper interpretation of LISREL output. LISREL assumptions, limitations, tricks, and traps will be explored. Specific topics include reviews of causality and path analysis, covariance algebra, creating path diagrams and structural equations, LISREL notation and syntax, considerations in model identification, estimation, evaluation, and interpretation. Specific application areas include confirmatory factor analysis and its extensions, causal models with directly observed and latent variables. Course also takes a critical look at the analysis of experimental data, modeling quadratic and interaction terms, analysis of ordinal and other non-normal variables.

PREREQUISITES

BUSI 6450, BUSI 6220, and BUSI 6240 (May be taken concurrently). Students must have a thorough knowledge of multiple regression, factor analysis, ANOVA and ANCOVA. Students are also expected to have a solid grasp of the fundamentals of research design, including how to assess the internal and external validity of research designs, as well as how to assess the validity and reliability of multi-item behavioral measures. Students are expected to have a working knowledge of matrix algebra.

CLASS ATTENDANCE:

Regular class attendance and informed participation are expected. Excessive absences could cause one to be automatically dropped from the course with an undesirable grade.

ACADEMIC INTEGRITY:

The policies stated here were derived from the University of North Texas Student Guidebook (for more details please see - http://vpaa.unt.edu/academic-integrity.htm). You are responsible for information published by the university in its official publication/website.

Scholastic integrity must be exhibited in your academic work, conduct, and methods. Academic work for which you receive an individual grade must be your original, individual effort. Although you may discuss assignments with others, the work you submit for a grade must be solely your own. If, in the instructor's opinion, any evidence exists that all or part of the work you submit for grading is that of another person, you (and the other person) will be given a zero for the assignment. This is one form of scholastic dishonesty. A second incident of academic misconduct will result in a grade of F in this course. You (and anyone involved with you) will be given an F in this course, if you are found to have cheated on an exam, or collaborated on an assignment with another student. Further action on incidents of scholastic misconduct will be referred to the dean of Students.

The term cheating includes, but not limited to, (1) use of any unauthorized assistance in taking quizzes, tests, or examinations; (2) dependence upon the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments; or (3) the acquisition, without permission, of tests or other academic material belonging to a faculty member or staff of the university.

The term plagiarism includes, but is not limited to, the use, by paraphrase or direct quotation, of the published or unpublished work of another person without full or clear acknowledgment. It also includes the unacknowledged use of materials prepared by another person or agency in the selling of term papers or other academic materials. (Source: Code of Conduct and Discipline at the University of North Texas.)

STUDENTS WITH DISABILITIES:

The College of Business Administration complies with the Americans with Disabilities Act in making
reasonable accommodation for qualified students with disability. If you have an established disability as defined in the Americans with Disabilities Act and would like to request accommodation, please see me as soon as possible.

**MISCELLANEOUS POLICIES:**

IMPORTANT DATES: Dates of drop deadlines, exams, final exams, etc., are published in the university catalog and schedule of classes. It is your responsibility to be informed with regard to these dates. Unawareness is no excuse.

**EXAMINATIONS**

Two examinations will be given during the semester (one of which will be a final examination given during the week of finals). In addition, short research projects will be assigned as part of the exams. The points for this semester are allocated as follows (this could be revised):

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam I</td>
<td>100</td>
</tr>
<tr>
<td>Assignments</td>
<td>200</td>
</tr>
<tr>
<td>Final Exam</td>
<td>100</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>400</strong></td>
</tr>
</tbody>
</table>

Research projects are important parts of this course. Appropriate level (expected from a graduate student) of input, both qualitative and quantitative is essential. The projects will need significant work outside the classroom. This is in addition to the time spent on class preparation. These projects would require students to think through theoretical and empirical issues associated with a research idea. In addition, language is an important aspect of a project report. The rationale is that if you cannot communicate your ideas effectively, there is little chance of it getting accepted, published and used. While presentation styles may differ across students, it is expected that all students use appropriate language suitable for Journal publications in your area. Please make sure that you take care of grammar, spelling, sentence formation, etc., while preparing your report. One point will be deducted for each grammar and spelling mistake. Due dates for completing various tasks and projects will be identified in class. Adherence to these dates is absolutely essential. Every 24-hour delay beyond the agreed due date and time will result in a deduction in the project grade for that project only as per the stepwise procedure outlined below:

1. Project submitted on or before the due date and time you can earn a maximum of 100%.
2. After the due date/time, but within the next 24 hours (1-day block) reduces the maximum to 75%
   (Assigned points for the project = actual points in % x 0.75).
3. Subsequent (2nd day block) 24 hours reduces the maximum to 50%.
4. Reports submitted within the next 24 hours (3rd day block) reduces the maximum to 25%.
5. After that I will assign zero (0) points for the project.

Letter Grades:

As a rule there will be no curving. If I feel the need to curve, it would be done at the end of the semester after all the Exams and Projects points have been compiled and summated. No letter grade will be assigned for individual exam or project. Letter grades will be assigned only after summing (totaling) the points for all the Exams and Projects. This summated (or total) point will then be used for assignment of letter grades for the course as per the following scale:

- 90+ = A = "Excellent, above and beyond what was expected (the class average)."
- 80-89 = B = "Good, you did what you were expected to do"
- 70-79 = C = "Passing, merely satisfied the bare minimum requirements"
- 60-69 = D = "Failing"
This is not a legal contract. It is only an outline for this course in terms of its objectives, expectations, tasks and activities, schedule of classes, and assessment and evaluation criteria. We will try to adhere to this as far as possible. However, depending upon the need of the class, the instructor reserves the right to change these and other policy requirements included in this document and announced in class.
COURSE OUTLINE:

The syllabus below is a tentative outline for the semester. It is meant to be a guide and several items are subject to change. Exams may be moved up in time. Certain topics may be stressed more or less than indicated. Chapters are in Barbara Byrne’s SEM textbook, except for the first week.

<table>
<thead>
<tr>
<th>#</th>
<th>Week</th>
<th>Topic</th>
<th>Chapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aug 28</td>
<td>Exploratory Factor Analysis Methods and their Objectives; Assumptions; Conceptual background; Deriving factors &amp; assessing overall fit</td>
<td>Ch. 3 (Hair et. al.)</td>
</tr>
<tr>
<td>2</td>
<td>Sept 4</td>
<td>Labor day</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Sept 11</td>
<td>Introduction to Matrix and Covariance Algebra</td>
<td>Ch. 1 (a)</td>
</tr>
<tr>
<td>4</td>
<td>Sept 18</td>
<td>Introduction to Causal &amp; CSM; Causality &amp; Causal Models; Articles using SEM; Covariance Algebra; Path Analysis</td>
<td>Ch. 1 (a)</td>
</tr>
<tr>
<td>5</td>
<td>Sept 25</td>
<td>Introduction to the Full LISREL Model; Path Diagrams &amp; Notation; Structural Equations &amp; Path Diagrams; Defining the unit of measurement; Fixed, Free, Constrained Parameters</td>
<td>Ch. 2 (a)</td>
</tr>
<tr>
<td>6</td>
<td>Oct 2</td>
<td>Introduction to LISREL, PRELIS, and SIMPLIS; and AMOS</td>
<td>Ch. 2 (a)</td>
</tr>
<tr>
<td>7</td>
<td>Oct 9</td>
<td>Testing the factorial validity of a Theoretical Construct; Measurement Error and Measurement Models; Measurement models; Validity: Content, Criterion, Construct, Convergent, Discriminant; Estimates of Reliability: Classic and SEM. Testing the factorial validity of a Theoretical Construct; Model Fitting Process; Model Misspecification</td>
<td>Ch. 3 (a)</td>
</tr>
<tr>
<td>8</td>
<td>Oct 16</td>
<td>Exam - 1</td>
<td>In class</td>
</tr>
<tr>
<td>9</td>
<td>Oct 23</td>
<td>Applications of first-order Confirmatory Factor Analysis; Re-specification of Models; Comparison of alternative structural models; Model Evaluation; Model Interpretation -- Interpreting the LISREL Output</td>
<td>Ch. 4</td>
</tr>
<tr>
<td>10</td>
<td>Oct 30</td>
<td>Application of second-order Confirmatory Factor Analysis</td>
<td>Ch. 5</td>
</tr>
<tr>
<td>11</td>
<td>Nov 6</td>
<td>Application of a full structural Model and testing its Validity</td>
<td>Ch. 7</td>
</tr>
<tr>
<td>12</td>
<td>Nov 13</td>
<td>Application of a full structural Model and testing its Validity</td>
<td>Ch. 7</td>
</tr>
<tr>
<td>13</td>
<td>Nov 20</td>
<td>Application of a full structural Model and testing its Validity</td>
<td>Ch. 7</td>
</tr>
<tr>
<td>14</td>
<td>Nov 27</td>
<td>Testing moderating relationships</td>
<td>Ch. 8, 9, 10 &amp; 11</td>
</tr>
<tr>
<td>15</td>
<td>Dec 4</td>
<td>Related topics</td>
<td>Ch 10 &amp; 11</td>
</tr>
<tr>
<td>16</td>
<td>Dec 11</td>
<td>Exam-2 (time to be announced later)</td>
<td></td>
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</tbody>
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Please note: Class meets on Mondays, 2:00-4:50 PM, BLB 060.

(a) Also read the Hair et all book chapters on SEM (believe it is the chapters in the last section).