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## Structural Equation Modeling-- RSCH 8150 [Spring 2018]

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### Course Description:

*Structural Equation Modeling* (SEM) is designed to apply general statistical modeling techniques to establish relationships among variables. Topics include regression models, path analysis models, exploratory and confirmatory factor analyses, latent variables, basic steps in structural equation modeling, multiple indicators and multiple causes (MIMIC) model, multi-group model, multilevel model, mixture model, structured mean model, second order factor model, latent variable growth model, and dynamic factor model.

### Course Prerequisites:

RSCH 8140 or equivalent, SPSS skills (or equivalent computer skills)

### Course Rational:

Structural equation modeling (SEM) has become part of essential training in advanced research techniques in the field of education/counseling. The use of structural equation modeling (SEM) has increased among researchers because of the statistical ability to analyze complex relationships that exist in the field. SEM provides researchers with powerful techniques that takes into account the modeling of interactions, nonlinearities, correlated independents, measurement error, correlated error terms, multiple latent independents each measured by multiple indicators, and one or more latent dependents also each with multiple indicators. Empirical research articles that use structural equation modeling as a major analytic tool appear regularly in leading academic journals. The purpose of this course is to train doctoral students in both the conceptual and applied uses of SEM.

### Course Textbooks:

Kline, R. B. (2016). *Principles and Practice of Structural Equation Modeling, 4<sup>th</sup> edition*. Guilford press.

Acock, Alan C. *Discovering Structural Equation Modeling Using Stata, Revised Edition, 2013*

### Course Software:

STATA 15 and STATA 14: Purchase a student six-month license of STATA 15 IC. STATA 14 is available in campus through Citrix

## Course Objectives:

1. Introduce students to the fundamentals of SEM, including model specification, estimation, testing model fit.
2. Provide students with an understanding of SEM, including the assumptions required to create unbiased results.
3. Provide students with the tools to use SEM to address important educational and counseling problems when the problems and data are appropriate to the method.
4. Provide students experience in specifying, estimating, and testing a simple SEM and writing up the results in a short paper structured on the model of a research article.
5. Provide students with a solid foundation in SEM with which to pick up more advanced topics not covered in this course.

## Course Evaluation:

(50%) 1. Attend class, participate in class discussions, and complete homework assignments/activities as indicated on the syllabus or as assigned in class

(20%) 2. Mid-term Exam

(30%) 3. Final project

*Note.* Late assignments and projects are not accepted unless approved

## Grading Scale:

A ..... 90-100

B ..... 80-89

C ..... 70-79

## UNIVERSITY AND COLLEGE OF EDUCATION POLICIES AND STATEMENTS

### **Code of Student Academic Integrity**

Students have the responsibility to know and observe the requirements of the UNC Charlotte Code of Student Academic Integrity. This code forbids cheating, fabrication or falsification of information, multiple submission of work, plagiarism, abuse of academic materials, and complicity in academic dishonesty. <http://legal.uncc.edu/policies/ps-105.html>

Faculty may ask students to produce identification at examinations and may require students to demonstrate that graded assignments completed outside of class are their own work.

### **College of Education Commitment to Diversity**

The College of Education at UNC Charlotte is committed to social justice and respect for all individuals, and it seeks to create a culture of inclusion that actively supports all who live, work, and serve in a diverse nation and world. Attaining justice and respect involves all members of our community in recognizing that multi-dimensional diversity contributes to the College's learning environments, thereby enriching the community and improving opportunities for human understanding. While the term "diversity" is often used to refer to differences, the College's intention is for inclusiveness, an inclusiveness of individuals who are diverse in

ability/disability, age, economic status, ethnicity, gender, language, national origin, race, religion, and sexual orientation. Therefore, the College aspires to become a more diverse community in order to extend its enriching benefits to all participants. An essential feature of our community is an environment that supports exploration, learning, and work free from bias and harassment, thereby improving the growth and development of each member of the community.

### ***College of Education Technology Statement***

Professional education programs at UNC Charlotte are committed to preparing candidates for success in the 21<sup>st</sup> century through an emphasis on knowledge, effectiveness and commitment to technology integration and application. Preparation in the integration and application of technology to enhance student learning is essential for all candidates. Programs across the professional education unit, including the College of Arts + Architecture, College of Education, and College of Liberal Arts and Sciences, reflect this commitment in coursework, early field experiences, and clinical practice which includes student teaching and/or the capstone/internship phase of the respective programs.

### ***Religious Accommodations***

UNC Charlotte provides reasonable accommodations, including a minimum of two excused absences each academic year, for religious observances required by a student's religious practice or belief. Such reasonable accommodations must be requested in accordance with the procedures in this Policy, and include the opportunity for the student to make up any tests or other work missed due to an excused absence for a religious observance. It is the obligation of students to provide faculty with reasonable notice of the dates of religious observances on which they will be absent by submitting a request for religious accommodation to their instructor prior to the census date for enrollment for a given semester (typically the 10<sup>th</sup> day of enrollment).

### ***Disability Accommodations***

If you have a disability that qualifies you for academic accommodations, contact the Office of Disability Services in Fretwell 230 or call 704-687-4355 at the beginning of the semester. Some requests for accommodations cannot be honored without supporting documentation from the Office of Disability Services. All information shared with the instructor concerning a disability will remain strictly confidential unless otherwise specified by the instructor.

### ***Online Student Course Evaluation Process and Confidentiality***

Courses in the College of Education are evaluated through an online evaluation survey process. Student course evaluations provide an important source of feedback for faculty regarding course design and instructional effectiveness. The online course evaluations are administered at the end of the term, during the final two week (prior to final exams). You will receive an email announcement alerting you when the survey period opens. Periodic reminders will be sent during the time the survey is open. Please be advised that this process is secure and confidential. The technology used ensures anonymity of participants as well as confidentiality. The College of Education is committed to excellent instruction and student support. Please help in continuing this commitment by participating in the course evaluation process.

***Appropriate Use of Technology***

It is expected that phones and tablets will be turned off or silent and will not be used during class.

***Credit Hour Statement***

This 3-credit course requires 45 hours of classroom or direct faculty instruction and 90 hours of out-of-class student work each week for approximately 15 weeks. Out-of-class work may include but is not limited to: reading, assignments, projects, and final presentation.

***Important Dates***

Students are responsible for being aware of dates to withdraw from class without consequences. All the dates can be found at the following website (<http://www.registrar.uncc.edu/calendar.htm>).

***Policy on Grade of Incomplete***

The grade of "I" is assigned at the discretion of the instructor when a student who is otherwise passing has not, due to circumstances beyond his/her control, complete all the work in the course (UNCC Course Catalog).

***Inclement Weather Policy***

UNCC announces the University closing on public broadcast or you can call 704-687-2877 for an update. I often post-closing information on the class homepage, and I will update my answering machine to inform you of cancellations of class. I realize that some of you travel a great distance to attend class and our class finishes late in the evening. Please use your best judgment on what are safe conditions for your travel.

**ATTENDANCE**

I am trying to modify this class to better meet your needs. Instead of all of us attending class the same time every week in the same classroom, I want to expand this class outside of that rigid schedule and make you more in control of your time without decreasing the quality of your education. There will be times that we have to meet together as a group. **You should make every effort to attend those classes.** If you cannot attend, you are responsible for all the notes, assignments, and activities. I strongly suggest that you team up with someone in the class to have a support system. I will accommodate student observances of the holy days of all religious denominations.

I plan to use the technologies that we have (conference calls, email, canvas) to assist you in the project.

## RESPONSIBILITIES

### *Student Responsibilities:*

1. Check canvas for updates
2. Complete all reading, assignments, and projects on time
3. Don't wait until the last minute to complete assignments and projects
4. Form teams to help each other
5. Attend class. If you have to miss class, meet with a member of your team for update. If you still are having difficulty, email or call me.
6. Be respectful and mindful of others.

### *Kailas's Responsibilities:*

1. DO NOT waste students' time
2. Provide meaningful class activities and assignments
3. Provide opportunities for student success
4. Provide immediate feedback
5. Be respectful and mindful of others

## COURSE CONTENT

1. Basics: Causality and Causal Models
2. Models with Directly Observed Variables
3. Measurement Models: Confirmatory Factor Analysis
4. Structural Equation Models with Latent Variables
5. Model Building: Testing Goodness of Fit
6. Multiple Groups Analysis
7. Generalized Structural Equation Models
8. Latent Growth Curve Analysis Basics
9. Writing about SEMs.

Detailed course outline and schedule will be posted on canvas

## THE COLLEGE OF EDUCATION'S CONCEPTUAL FRAMEWORK AND PROFESSIONAL STANDARDS

***Professional Educators Transforming Lives***, the Conceptual Framework for Professional Education Programs at UNC Charlotte, identifies the proficiencies that our graduates will demonstrate. During coursework, early field experiences, and clinical practice candidates have multiple opportunities to develop the **knowledge, effectiveness, and commitment** necessary to transform the lives of the learners with whom they work. RSCH 8150 seeks to develop proficiencies that are highlighted below.

**Core Proficiency: Knowledge.** Candidates will demonstrate the **Knowledge** that provides the foundation for transforming the lives of the children, youth, and families with whom they work. This knowledge includes elements such as:

- K1: Knowledge relevant to life in the 21<sup>st</sup> century
- K2: Specialty area knowledge
- K5: Self-awareness

**Core Proficiency: Effectiveness.** Candidates will demonstrate **Effectiveness** in their work with children, youth, and families by applying knowledge and developing effective skills in areas such as:

- E1: 21<sup>st</sup> century skills
- E2: Planning, implementation, and evaluation
- E3: Research-based practice
- E4: Research skills

**Core Proficiency: Commitment.** Candidates will demonstrate their **Commitment** to transforming the lives of others through their actions in areas such as:

- C1: Positive impact on learners
- C2: Ethics
- C4: Collaboration
- C6: Professional identity and continuous growth

The core proficiencies of **knowledge, effectiveness, and commitment** are fully aligned with the North Carolina standards for teachers, school executives, and counselors. RSCH 8120 seeks to develop North Carolina standards that are highlighted below.

**North Carolina Standards for Graduate Teacher Candidates (2009):** 1) Teacher leadership, 2) Respectful educational environments, 3) Content and curriculum expertise, 4) Student learning, 5) Reflection

**North Carolina Standards for School Executives (2006):** 1) Strategic leadership, 2) Instructional leadership, 3) Cultural leadership, 4) Human resource leadership, 5) Managerial leadership, 6) External development leadership, 7) Micropolitical leadership.

**North Carolina Professional School Counseling Standards (2008):** 1) Demonstrate leadership, advocacy, and collaboration; 2) Promote a respectful environment for a diverse population of students; 3) Understand and facilitate the implementation of a comprehensive school counseling program; 4) Promote learning for all students; 5) Actively reflect on their practice.