1. **ERMA 8340**
       3 credit hours

2. **Semester FS 2011**
       Instructor: Margaret E. Ross
                          4018 Haley Center
                          (334) 844-3084   rossma1@mail.auburn.edu   (the first 1 = one)
       Office Hours: Tuesday 3:30 – 4:30 am and Monday 2 - 4 pm or by appointment
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3. **Recommended**
    Resources

Byrn, B. (2010). Structural equation modeling with AMOS: Basic concepts, applications, and programming. Routledge
       Tyler & Francis Group, LLC, NY.

Arbuckle, J. L. (1995-2010). IBM SPSS$^{(R)}$ AMOS^{TM} 19 User's guide. http//www.amosdeveloment.com/amos.pdf
       (or just search for AMOS 19 manual)

Mertler, Craig A. and Vannatta, Rachel A. (2010).   Advanced and Multivariate Statistical Methods: Practical
       Application and Interpretation.   Pyrczak Publishing, Los Angelas.

Publication manual of the American Psychological Association (6th ed.). Washington D.C.,
       American Psychological Association.

4. **Course Description**
This course is designed to provide students the understanding of factor analytic statistical procedures.   Regression and
path analysis, prerequisites for understanding factor analysis, are reviewed. This course emphasizes the conceptual and
practical application of factor analysis.   Both confirmatory and exploratory procedures are addressed to provide an
overall understanding of the various uses of factor analysis, including both measurement and structural models. A
hands-on approach to analyzing data using AMOS and interpreting output is used.

5. **Course Objectives**
Students will:
•   Gain an understanding of factor analytic procedures.
•   Apply knowledge of factor analysis by analyzing data to assess factor analytic models.
•   Apply knowledge of factor analysis through interpreting output and revising models as indicated by results
•   Interpret the results of the analyses in terms of the research hypothesis and/or purposes

6. Tentative Course Content and Schedule

Class 1   **Introduction and Syllabus**
                Review of Dummy Coding

Class 2   **Matrix Algebra**
                ANOVA using Matrix Algebra
                Review and Extension of Regression Procedures
                Large Scale data Sets Specifying Variable Sets and Weighting
                Upload Data Set and Weighting Information

Class 3   **Path Analysis**
                Path Coefficients
                Direct and Indirect Effects
                Path Analysis Assignment
                Upload Path Analysis Assignment

Class 4   **Exploratory Factor Analysis**
                Rotation
                Principal Axes, Principal Components
                Estimation procedures (Least Squares, ML, Bayes)
                Communalities
                Percent of Variance Explained
                Eigenvalues
                Scree plot
                Structure and Pattern Coefficients
                Exploratory Factor Analysis (large scale data set)
                Upload Annotated Exploratory FA Output and Model
                (Annotation to be interpretation of major output components)

Class 5   **Introduction to Multi-Trait Multi-Method**
                Introduction to Structural Equation Modeling and AMOS
                Model Specification Assignment
                Upload Specification Assignment
                Projects (for A)

Class 6   **Identification**
                Fit Indices
                Misspecification
                Non-centrality Parameter
                Confirmatory FA (large scale data set)
                Upload Confirmatory FA Model and Annotated Output
                (Annotation to be interpretation of major output components)
                Readings: Chapter 3

Class 7   **Errors and Problems**
                Missing Data Solutions
                Non-Normality and bootstrapping
                Monte Carlo and Bootstrapping
                Determinate of a Matrix
                Ill conditioned matrix
                Identifying Data Problems (large scale data set)
                Upload Assessment of Data Problems
                Projects (for A)
                Readings: Chapter 12 and Chapter 13

Class 8   **The measurement model**
        Mahalanobis distance
        Non-centrality parameters
        Categorical varianble
        Bayesian estimates
        Postier probability
        Measurement Model (w second order factor) (large scale data set)
        Upload Measurement Model and Annotated Output
        (Annotation to be interpretation of major output components)
        Readings: Chapter 4 and Chapter 5

Class 9   **The Full Structural Model**
        Full Structural Model (large scale data set)
        Upload Structural Model and Annotated Output
        (Annotation to be interpretation of major output components)
        Readings: Chapter 6

Class 10   **Multiple Group Equivalence**
        Multiple Group Equivalence (large scale data set)
        Upload Multiple Group Model and Annotated Output
        (Annotation to be interpretation of major output components)
        Projects (for A)
        Readings: Chapter 7

Class 11   **Briefly Review Dummy Coding**
        Problems related to Post Hoc Model Fitting
        Multi-Trait Multi-Method Review
        Cross-validation
        In-class Projects
        Readings: Chapters 8-10

Class 12   **Poster Presentations of In-class Projects**

Class 13   **Latent Growth Modeling**

Class 14   **Projects consultation (for A)**

Class 15   **Roundtable and PowerPoint Presentations (for A – all welcome)**

7. Course Requirements and Evaluation
Learning Methods
Lectures, discussions, readings, class exercises and lab assignments.

Student Assessment
      In-class Assignments
            Completion   25%
            Accuracy of interpretations   25%
      In-class Projects (classes 11-12)
            Accuracy   50%
      Authentic Projects   To be completed for an A
      Roundtable Presentation   To be completed for an A (all welcome)

A –   Completion of in-class assignments and projects with at least 90% accuracy and completion of Authentic Project with at least 80% accuracy
B –   Completion of in-class assignments and projects with at least 80% accuracy
C –   Completion of in-class assignments and projects with at least 70% accuracy
D -   Completion of in-class assignments and projects with at least 60% accuracy
F –   Failure to meet minimum requirements for a D

- You CANNOT make up more than 2 in-class assignments. Thus, if you miss more than two assignments, your percent grade will be affected.
- If you are absent for the in-class project you will be assigned an alternative project that is AT LEAST comparable to the in-class project and that is to be completed on your own in order to earn partial points (up to 90%)

Authentic Project Outline

<div align="center">Introduction</div>

Introduction to the research and statement of significance of the problem or issue addressed
Literature review (very short)
Specific research questions to be answered.
        Are they clearly stated?
        Are they feasible/legitimate?
        Does it lend itself to t-test or ANOVA procedures?

<div align="center">Methodology</div>

Participants
Full description of participants

Measures
Instrumentation Description in detail (Validity and Reliability important here!)

Procedures
Procedures (detailed description of what you did – step by step)
Data processing and analysis (how will you analyze the data and why)?

<div align="center">Results</div>

Are **all** appropriate statistics clearly stated in APA style?
Are tables or graphs appropriately used?

Discussion

Results in words
Results in light of past research/theory
Recommendations
Limitations discussed

A more detailed rubric will be handed out closer to the time the proposal and presentation are due.
The paper is to be written in APA style.

8. Class Policy Statements

Attendance Policy
- Excellent attendance is expected.
- I will start class on time so if you are late you will need to get notes from another student.
- I will allow only two lab make-ups.   If you miss more classes you will not be able to earn the points for the assignment.

Late Assignments Policy
- Assignments turned in late will receive a 2% reduction in earned points per day.   The only exception will be in the case of emergency.
- Except for work requiring calculations, all work must be typed or it will **not** be graded.   Late penalty will be applied to work completed in writing and then turned in late in typed format for a grade.

Incompletes and Withdrawals
Grades associated with incomplete course work or withdrawal from class will be assigned in strict conformity to University policy (see Auburn University Bulletin).   If you wish to drop this course you may do so by the 10th class day with no grade assignment. From the 10th class day to mid-quarter a W (withdrawn-passing) grade will be recorded in your transcripts. After this period withdrawal from the course will only be granted under unusual circumstances and must be approved by the Dean of the College of Education.

Note that a new incomplete grade (IN) policy is in effect.   The new policy requires that students complete a form requesting that an IN grade be assigned.   If this form in not completed and given to the instructor of the class, a grade will be assigned with a score of zero (0) for work that has not been completed and turned in by the time the instructor reports grades.

Academic Misconduct
The Department of EFLT recognizes university policy regarding academic misconduct. Violations include, but are not limited to: plagiarism, unauthorized assistance during examinations, submitting another's work product as your own, using another's words as your own without appropriate citation, sharing unauthorized materials with another that contain questions or answers to examinations, altering or attempting to alter assigned grades. In accordance with University policy regarding academic misconduct, students may be subject to several sanctions upon violations of the Student Academic Honesty Code. See the Tiger Cub publication for the current year for specifics regarding academic misconduct as well as student's rights and responsibilities associated with the Code.

Disability Accommodations
Students who need special accommodations in class, as provided for by the American Disabilities Act, should arrange a confidential meeting with the instructor during office hours the first week of classes - or as soon as possible if accommodations are needed   immediately. You must bring a copy of your Accommodation Memo and an Instructor Verification Form to the meeting.   If you do not have these forms but need accommodations, make an appointment with the Program for Students with Disabilities, 1244 Haley Center, 844-2096.