**RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY**
**SCHOOL OF SOCIAL WORK**
**COURSE OUTLINE**
16:910:638:01　　　　Advanced Statistical Methods　　　　Fall 2016

Instructor:　　　　Andrew Peterson
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Credit Hours:　　　3
Classroom Hours:　Monday, 2:00-4:40 pm
Office hours:　　　By appointment

## Course Overview and Objectives

This is a course in advanced statistical methods. The objective of the course is to achieve an understanding of the advantages and limitations of various statistical techniques. The focus of this course is principally upon the development of both conceptual and computer tools needed for advanced statistics in hypothesis testing, model fitting and estimation, and interpretation of data. Students are expected to use actual data to gain experience on data analysis and data interpretation through computer exercises. The objectives of this course are: (1) to provide students with knowledge on multivariate statistical analyses, (2) to develop students' skills in modeling and carrying out their own research, and (3) to improve students' abilities to critically analyze published work in the social sciences.

## Required Materials

> Byrne, B.M. (2010). Structural Equation Modeling with AMOS: Basic Concepts, Applications, and Programming, Second Edition. New York: Routledge/ Taylor & Francis. ISBN-978-0-8058-6373-4.
>
> Field, A. (2013). Discovering Statistics Using IBM SPSS Statistics. 4th Edition. Los Angeles: Sage. ISBN: 9781446249185.
>
> IBM SPSS Statistics Standard GradPack (including AMOS for structural equation modeling). Available at www.software.rutgers.edu/.

## Course Requirements and Grading

1) It is important that assigned readings be completed on a timely, weekly, basis in order to have informed class discussions. All class lectures will assume that students have read the assigned material.

2) Class participation and attendance (10% of final grade) are considered in evaluating grades. Students are expected to notify the class instructor if they are unable to attend class for any reason. Unexcused absences will affect your grade negatively.

3) Four assignments (60% of final grade) will be provided. These are intended to provide you an opportunity to practice, and to test, the analytic skills you have learned from the readings and hands-on experiences. A dataset will be provided. Each assignment is worth 15% of your grade.

4) A final project (30%). Students are expecting to address research questions or hypotheses using statistical analyses that are covered over the semester. Students will present their projects in class. A detailed description will be provided in advance of the due date.

The grading scale for the Rutgers Graduate School of Social Work is as follows:

A        92-100
B+      87-91
B        82-86
C+      77-81
C        70-76
F        0-69

## Course Outline

    I.    <u>Weeks 1 (Sept. 12) & 2 (Sept. 19)</u>

        Introduction to data analysis
           Linking research questions to measurement, design and analysis
           Flat files
           Variables, variable labels, and value labels
           Frequency distributions/histograms/scatterplots

        Data management and cleaning
           Sorting
           Merging
           Recoding items
           Computing scales/composite variables

        Reliability and descriptive statistics
           Coefficient alpha
           Levels of measurement
           Measures of central tendency
           Measures of dispersion

      Readings for Weeks 1 & 2:
          Field (2013) (Chps. 1 - 5)
          Streiner, D.L. (2003). Starting at the beginning: An introduction to coefficient alpha and internal consistency. *Journal of Personality Assessment*, 80, 99-103.

    II.    <u>Weeks 3 (Sept. 26), 4 (Oct. 3), & 5 (Oct. 10)</u>

        Relationships between variables
           Correlation
           Regression
           Path analysis
           Testing mediation and moderation

      Readings for Week 3:
          Field (2013) (Chps. 7, 8, & 10)
          Ang, R. P., & Huan, V. S. (2006). Relationship between academic stress and suicidal ideation: Testing for depression as a mediator using

multiple regression. *Child Psychiatry and Human Development, 37,* 133-143.

Magill, M. (2011). Moderators and mediators in social work research: Toward a more ecologically valid evidence base for practice. *Journal of Social Work, 11,* 387-401.

Readings for Weeks 4 and 5:
Byrne (2010) (Chps. 1 & 2)

Iacobucci, D. (2010). Structural equations modeling: Fit indices, sample size, and advanced topics. *Journal of Consumer Psychology, 20*(1), 90-98.

Peterson, N.A., Farmer, A.Y. & Zippay, A. (2014). The implicit curriculum in an urban university setting: Pathways to students' empowerment. *Journal of Social Work Education, 50,* 630-647.

Powell, K.G. & Peterson, N.A. (2014). Pathways to effectiveness in substance abuse prevention: Empowering organizational characteristics of community-based coalitions. *Human Service Organizations: Management, Leadership, & Governance, 38,* 471-486.

\*\*\* ASSIGNMENT I DUE – OCT. 17 \*\*\*

III.     Weeks 6 (Oct.17), 7 (Oct. 24), & 8 (Oct. 31)

Group differences
   T-tests; indep. samples/ pairs
   Analysis of variance/covariance
     One-way, two-way, three-way ANOVAs/ interactions
     Repeated measures
   Multivariate analysis of variance/covariance
   Discriminant analysis

Readings for Week 6:
Field (2013) (Chps. 9, 11, & 12)

Readings for Week 7:
Field (2013) (Chps. 13, 14 & 15)

Readings for Week 8:
Field (2013) (Chp. 16)

Peterson, N.A. & Hughey, J. (2004). Social cohesion and intrapersonal empowerment: Gender as moderator. *Health Education Research, 19,* 533-542.

Peterson, N.A. & Speer, P.W. (2000). Linking organizational characteristics to psychological empowerment: Contextual issues in empowerment theory. *Administration in Social Work, 24,* 39-58.

\*\*\* ASSIGNMENT II DUE – NOV. 7 \*\*\*

IV.   <u>Weeks 9 (Nov. 7), 10 (Nov. 14), & 11 (Nov. 21)</u>

   Factor analysis
        Exploratory factor analysis
        Confirmatory factor analysis

  Readings for Weeks 9, 10, & 11:
       Byrne (2010) (Chps. 4 & 5)
       Field (2013) (Chp. 17)
       Peterson, N.A., Farmer, A.Y., Donnelly, L. & Forenza, B. (2014). Assessing the implicit curriculum in social work education: Heterogeneity of students' experiences and impact on professional empowerment. *Journal of Teaching in Social Work, 34,* 460-479.
       Peterson, N.A., Speer, P.W. & Hughey, J. (2006). Measuring sense of community: A methodological interpretation of the factor structure debate. *Journal of Community Psychology, 34,* 453-469.
       Worthington, R.L. & Whittaker, T.A. (2006). Scale development research: A content analysis and recommendations for best practices. *The Counseling Psychologist, 34,* 806-838.

 *** OPEN LAB – Nov. 28 ***

*** ASSIGNMENT III DUE – NOV. 28 ***

V.   <u>Weeks 12 (Nov. 28) & 13 (Dec. 5)</u>

  Testing full structural equation models
     Cross-lagged panel analysis

  Readings for Weeks 12 & 13:
       Byrne (2010) (Chp. 6)
       Martens, M.P. & Haase, R.F. (2006). Advanced applications of structural equation modeling in counseling psychology research. *The Counseling Psychologist, 34,* 878-911.
       Christens, B.D., Peterson, N.A. & Speer, P.W. (2011). Community participation and psychological empowerment: Testing reciprocal causality using a cross-lagged panel design and latent constructs. *Health Education & Behavior, 38*, 339-347.
       McMahon, S., Peterson, N.A., Postmus, J.L., Winter, S.C., Palmer, J.E. & Koenick, R.A. (2015). Predicting bystander behavior to prevent sexual assault on college campuses: The role of self-efficacy and intent. *American Journal of Community Psychology, 56,* 46-56.

*** ASSIGNMENT IV DUE – DEC. 5 ***

VI.    <u>Weeks 14 (Dec. 12) & 15 (Dec. 19)</u>

*** PROJECT PRESENTATIONS – DEC. 12 ***

*** FINAL PRODUCTS DUE – DEC. 19 ***

<u>Course Evaluation:</u>    Rutgers University issues a survey that evaluates both the course and instructor.  This survey is completed by students toward the end of the semester, and all answers are confidential and anonymous.  The instructor may also choose to conduct a mid-point evaluation.

<u>Academic Integrity Policy:</u>    All work submitted in a graduate course must be your own. It is unethical and a violation of the University's Academic Integrity Policy to present the ideas or words of another without clearly and fully identifying the source.  Inadequate citations will be construed as an attempt to misrepresent the cited material as your own.  Use the citation style preferred by the discipline. Plagiarism is the representation of the words or ideas of another as one's own in any academic exercise.  To avoid plagiarism, every direct quotation must be identified by quotation marks or by appropriate indentation and must be properly cited in the text or in a footnote. Acknowledgement is required when material from another source is stored in print, electronic, or other medium and is paraphrased or summarized in whole or in part in one's own words.  To acknowledge a paraphrase properly, one might state: "to paraphrase Plato's comment…" and conclude with a footnote identifying the exact reference.  A footnote acknowledging only a directly quoted statement does not suffice to notify the reader of any preceding or succeeding paraphrased material. Information which is common knowledge, such as names of leaders of prominent nations, basic scientific laws, etc., need not be footnoted; however, all facts or information obtained in reading or research that are not common knowledge among students in the course must be acknowledged.  In addition to materials specifically cited in the text, only materials that contribute to one's general understanding of the subject may be acknowledged in the bibliography. Plagiarism can, in some cases, be a subtle issue.  Any question about what constitutes plagiarism should be discussed with the faculty member. Plagiarism along with any and all other violations of academic integrity by graduate and professional students will normally be penalized more severely than violations by first-year undergraduate students.  Since all violations of academic integrity by a graduate or professional student are potentially separable under the Academic Integrity Policy, faculty members should not adjudicate alleged academic integrity violations by graduate and professional students, but should refer such allegations to the appropriate Academic Integrity Facilitator (AIF) or to the Office of Student Conduct.  The AIF that you should contact is Antoinette Y. Farmer, 732.932.2621. The student shall be notified in writing, by email or hand delivery, of the alleged violation and of the fact that the matter has been referred to the AIF for adjudication.  This notification shall be done

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within 10 days of identifying the alleged violation.  Once the student has been notified of the allegation, the student may not drop the course or withdraw from the school until the adjudication process is complete.   A TZ or incomplete grade shall be assigned until the case is resolved.  For more information regarding the Rutgers Academic Integrity Policies and Procedures, see: http://academicintegrity.rutgers.edu/integrity.shtml.

Disability
Accommodation: Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: https://ods.rutgers.edu/students/documentation-guidelines. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete the Registration form on the ODS web site at: https://ods.rutgers.edu/students/registration-form.