Syracuse University
School of Education
EDU 791 Advanced Seminar in Quantitative Research Methods
Spring 2017, Monday 4:00-7:00 pm, Huntington Hall Room 103

Instructor:	Qiu Wang, Ph.D., 359 Huntington Hall wangqiu@syr.edu	**Office Hours:**	Monday 1-3 pm or by appointment. Please contact me via email or discuss with me during class breaks.
Teaching Associate: TBD			

I. Prerequisites and Purpose of the Course

Successful completion of EDU 647 *Statistical Thinking and Applications*, or an equivalent course.

The purpose of this seminar is to facilitate SOE graduate students' integration of theory, research design, and measurement issues with knowledge of statistical procedures needed to plan, accomplish, and evaluate quantitative research projects. The course will build on the foundation provided by EDU 647 and will focus on the practical application of quantitative research techniques. Quantitative techniques covered in this seminar will include analysis of variance, multiple regression, multiple discriminant analysis, path analysis, and factor analysis. Students will complete a statistical portfolio using the SPSS statistical program and extent data sets to demonstrate your ability to manipulate and recode data, accomplish several statistical analyses, interpret the results of the analyses, and present the findings using both text and data tables.

II. Course Objectives

At the conclusion of the seminar, students will:
- Understand the role of research design in establishing causality.
- Understand measurement reliability and validity and their relationship to research validity and statistical outcomes.
- Understand the role of theory in the development of research questions and design strategies.
- Have a working knowledge of basic research (e.g., latent variables; methods of controlling extraneous variation) and statistical (e.g., variance, effect size) concepts that are central to the quantitative research tradition.
- Have a working knowledge of various experimental and non-experimental research designs, and their strengths and limitations in regard to research validity.
- Have a working knowledge of various statistical strategies in analyzing data, including analysis of variance, multiple regression, multiple discriminant analysis, and factor analysis.
- Be able to accurately interpret statistical output associated with these various statistical strategies.

- Use a computer and statistical software to accomplish data management and statistical analysis.
- Evaluate published research that makes use of intermediate/advanced statistical approaches in your area of scholarship.
- Write a research prospectus to address a research question in your area of scholarship.
- Present a research report in written and oral formats.
- Complete the following statistical analyses using SPSS for Windows software and extent data sets:
  - ❖ Recoding existing variables in a data set and compute new variables from existing variables in order to shape the data set for subsequent analyses.
  - ❖ Descriptive statistics including frequency distributions, means, standard deviations, and graphs such as box plots and scatter plots.
  - ❖ Testing assumptions associated with various statistical tests to determine whether the planned test is appropriate.
  - ❖ Simple analysis of variance (ANOVA) with post-hoc pair-wise significance tests.
  - ❖ Factorial ANOVA, including using covariates and interaction terms.
  - ❖ Multiple regression, including use of categorical and continuous variables, different variable entry techniques, testing moderator and mediator effects.
  - ❖ Multiple discriminant analysis & logistic regression
  - ❖ Exploratory factor analysis to determine the dimensionality of a psychological measurement instrument.

III.   Accommodations and Policies

Special Needs

If you believe that you need accommodations for a disability, please contact the Office of Disability Services (ODS), http://disabilityservices.syr.edu, located at 804 University Avenue, room 309, or call 315-443-4498 for an appointment to discuss your needs and the process for requesting accommodations. ODS is responsible for coordinating disability-related accommodations and will issue "Accommodation Authorization Letters" to students with documented disabilities as appropriate. Since accommodations may require early planning and generally are not provided retroactively, please contact ODS as soon as possible.

Our community values diversity and seeks to promote meaningful access to educational opportunities for all students. Syracuse University and I are committed to your success and to supporting Section 504 of the Rehabilitation Act of 1973 as amended and the Americans with Disabilities Act (1990). This means that in general no individual who is otherwise qualified shall be excluded from participation in, be denied benefits of, or be subjected to discrimination under any program or activity, solely by reason of having a disability.

You are also welcome to contact me privately to discuss your academic needs although I cannot arrange for disability-related accommodations.

Academic Integrity

Syracuse University's academic integrity policy reflects the high value that we, as a university community, place on honesty in academic work. The policy defines our expectations for academic honesty and holds students accountable for the integrity of all work they submit. Students should understand that it is their responsibility to learn about course-specific

expectations, as well as about university-wide academic integrity expectations. The university policy governs appropriate citation and use of sources, the integrity of work submitted in exams and assignments, and the veracity of signatures on attendance sheets and other verification of participation in class activities. The policy also prohibits students from submitting the same written work in more than one class without receiving written authorization in advance from both instructors. The presumptive penalty for a first instance of academic dishonesty by an undergraduate student is course failure, accompanied by a transcript notation indicating that the failure resulted from a violation of academic integrity policy. The presumptive penalty for a first instance of academic dishonesty by a graduate student is suspension or expulsion. SU students are required to read an online summary of the university's academic integrity expectations and provide an electronic signature agreeing to abide by them twice a year during pre-term check-in on MySlice. For more information and the complete policy, see http://academicintegrity.syr.edu.

Religious Observances policy

SU's religious observances policy recognizes the diversity of faiths represented among the campus community and protects the rights of students, faculty, and staff to observe religious holy days according to their tradition. Under the policy, students are provided an opportunity to make up any quiz, examination, critique, or work requirements that may be missed due to a religious observance provided they notify their instructors before the end of the second week of classes. For fall and spring semesters, an online notification process is available through MySlice/Student Services/Enrollment/My Religious Observances from the first day of class until the end of the second week of class (http://supolicies.syr.edu/emp_ben/religious_observance.htm).

IV.   Attendance and Make-Ups

Attendance is required. Moreover, please make every effort to be on time for class, as late arrivals are disruptive to the class process. I prefer that papers and projects be submitted on the date they are due, but if you anticipate a problem in competing assignments on time, let me know ASAP, and we will develop an alternate plan.

V.   Required Texts and Supplementary Resources:

1. Keith, T. Z. (2006). Multiple regression and beyond. New York: Pearson Education.

2. Leech, N., Barrett, K., & Morgan, G. (2011). IMB SPSS for Intermediate Statistics: Use & Interpretation (4ᵗʰ   Ed.). New York: Lawrence Erlbaum.

* Supplementary reading packet – These will be available on the class Blackboard site (via electronic access). These readings will be designated **"SR"** in the syllabus.

* Note: The IBM SPSS program is available on all Windows ITS public lab computers at SU (http://its.syr.edu/licenses/SPSS%20Statistics.html). Please check the University Bookstore to purchase IBM SPSS.

VI.   Grading Procedure & Course Assignments:

Participation:	10 points	Includes attendance, presentation & class group activities.
Article Critiques	40 points (20 pts. each)	due February 20th (Class 5); April 3rd (Class 10)
Statistical Portfolio	20 points	due Feb. 20th; Mar. 20th; April 17th. Submit your completed work electronically.
Research Prospectus Or Integrative Review	30 points	due May 1st (Final Exam Week)

Alternate Assignment for the Research Prospectus (for those who have written one or more of these in previous graduate classes): Do an integrative review of empirical (quantitative) studies in your area of interest. Whereas in the article critique, you will critique the article methodology intensively, in this integrative review you will critique the body of work, using the same criteria (research validity).

Evaluation of students' work is based on a standard point system. A total of 100 points is possible and alphabetic grades are assigned according to the following numeric intervals:

A = 93-100	B+ = 88-89	C+ = 78-79
A- = 90-92	B = 83-87	C = 73-77
	B- = 80-82	C- = 70-72

VII.   Tentative Schedule

***   January 16th Martin Luther King Jr. Day no class   ***

January 23rd – Class 1

   Overview of the class & Review: Readings, assignments, due dates, etc. The scientific method and knowledge claims; modeling causal relations and criteria for establishing causality; control of variation in research design. General Linear Model.
   Readings: None

January 30th – Class 2
   Review. Research concepts: research questions; constructs, latent variables, and operational variables. Research validity, research design, and statistical analysis. Statistical concepts: standard deviation, variance, correlation, covariance, and effect size.
   Readings:
   1. Bellini & Rumrill (1999). **SR**
   2. Leech et al. (2011). Chapters 1-2.

February 6th – Class 3

Correlation and multiple regression: Least squares estimation; predicted values and errors; variance partitioning, variance accounted for, incremental partitioning; variable entry methods; types of research questions addressed using multiple regression.
Introduction to SPSS: Mini-workshop in class.
Readings:
1. Keith (2006). Chapters 1-2, pp. 1-42.

February 13th – Class 4
Multiple regression: More detail.
Readings:
1. Keith (2006). Chapters 3-4, pp. 43-73.
2. Leech et al. (2011). Chapters 3 & 5,.

February 20th – Class 5
Multiple Regression: Methods of variable entry
Readings:
1. Keith (2006). Chapter 5, pp. 74-104.
2. Sodowsky et al. (1998). **SR**

***   **Stat Portfolio Assignment 1 Due**   ***

February 27th – Class 6
Analysis of categorical & continuous variables in multiple regression. Testing interactions using multiple regression.
Readings:
1. Keith (2006). Chapters 6-7, pp. 105-160.
2. Leech et al. (2008). Chapter 6.

***   *1st* **Article Critique due**   ***

March 6th – Class 7
Moderator and mediator analysis in multiple regression continued. Review of multiple regression techniques.
SPSS Mini-workshop in class.
Readings:
1. Keith (2006), Chapter 8, pp. 161-179.
2. Frazier, Tix, & Barron (2004). **SR**
3. Hollingsworth & Fassinger (2002). **SR**

***   **March 13th No Class: Spring Break**   Have Fun!   ***

March 20th – Class 8
Multiple regression: summary, diagnostics, and advanced issues in regression.
Readings:
1. Keith (2006), Chapter 9, pp.180-211.
2. Hoyt, Imel, & Chan (2008).

3. Leech (2011). Chapter 8.

***   **Stat Portfolio Assignment 2 Due**   ***

March 27th – Class 9
Non-linear and logistic regression.
Readings:
1. Miles & Shevlin (2001), In Applying regression & correlation: A guide for students & researchers. Chapter 6, pp. 136-164. **SR**
2. Roessler, Fitzgerald, Rumrill, & Koch (2001). **SR**
3. Diemer, M.A., Wang, Q. & Smith, A.V. (2010). Vocational Interests and College Major Selection Among Youth of Color in Poverty. *Journal of Career Assessment, 18(1)*, 97-110. (**optional**)

April 3rd – Class 10
Multiple discriminant analysis. Also, SPSS mini-workshop in class.
Readings:
1. Sherry (2006). **SR**
2. Bellini, Bolton, & Neath (1996). **SR**
3. Leech (2011). Chapter 7.
4. Vaughn, B., & Wang, Q. (2008). Classification Based on Tree-Structured Allocation Rules. *Journal of Experimental Education*, 76(3) 315-340 (**optional**)

***   **2nd Article Critique Due**   ***

April 10th – Class 11
Exploratory factor analysis & principal components analysis.
Readings:
1. Spicer (2005). Factor analysis. Chapter 7, pp. 181-202. **SR**
2. Sodowsky et al. (1994). **SR**
3. Nash & Moroz (1997). **SR**
4. Leech et al. (2011). Chapter 4.
5. Diemer, M. A., Wang Q. & Dunkle. J. H. (2009). Counseling Center Intake Checklists at Academically Selective Institutions: Practice and Measurement Implications. *Journal of College Student Psychotherapy*, 23(2), 135-250. (**optional**)

April 17th – Class 12
Introduction to Path analysis: an extension of multiple regression. Relationship of path analysis to multiple regression and to structural equation modeling.
Readings:
1. Keith (2006). Chapters 10-11, pp. 212-253
2. Bishop et al. (2002). **SR**

***   **Stat Portfolio Assignment 3 due**   ***

April 24th – Class 13
>   Introduction to multilevel modeling: multiple regression techniques when dealing with
>   different levels of data (e.g., student & teacher data together, or counselor & client data).
>   **Readings:**
>   1. Luke (2004), Chapters 1-2, pp. 1-52. **SR**
>   2. Leech et al. (2011). Chapter 11.
>   3. Dedrick et al (2009). **SR**

May 1st – Class 14
>   Final Project Presentation.

>   ***   **Research Prospectus/Integrative Review due**   ***

>   **American Educational Research Association (AERA April 27- May 1)**
>   **Explore:** http://www.aera.net/Events-Meetings
>   **1. AERA Divisions:**
>   **2. AERA Meeting Program:**

VIII.   Supplementary Readings (Blackboard/Electronic Reserve)
>   **   **Not available through Electronic Reserve**

Class 10 Bellini, J., Bolton, B., & Neath, J. (1996). Diagnostic determinants of rehabilitation
     counselor eligibility decisions. Journal of Rehabilitation Administration, 20(2), 93-106.

Class 2 Bellini, J., & Rumrill, P. (1999). Perspectives on scientific inquiry: Research validity in
     rehabilitation. Journal of Vocational Rehabilitation, 13(2), 131-138. (2009 Book chapter)

Class 12 Bishop, M., Berven, N., Hermann, B., & Chan, F. (2002). Quality of life among adults
     with epilepsy: An exploratory model. Rehabilitation Counseling Bulletin, 45, 87-95.

Class 13 Dedrick R.F., Ferron J.M., Hess M.R., Hogarty K.Y., Kromrey J.D., Lang T. R. et al
     (2009). Multilevel modeling: a review of methodological issues and applications. Review
     Education Research, 79 (1), 69–102

Class 9 Diemer, M.A., Wang, Q. & Smith, A.V. (2010). Vocational Interests and College Major
     Selection Among Youth of Color in Poverty. Journal of Career Assessment, 18(1), 97-
     110. **
Class 11 Diemer, M. A., Wang Q. & Dunkle. J. H. (2009). Counseling Center Intake Checklists
     at Academically Selective Institutions: Practice and Measurement Implications. Journal
     of College Student Psychotherapy, 23(2), 135-250. **

Class 7 Frazier, P., Tix, A., & Barron, K. (2004). Testing moderator and mediator effects in
     counseling psychology research. Journal of Counseling Psychology, 51, 115-134.

Class 7 Hollingsworth, M., & Fassinger, R. (2002). The role of faculty mentors in the research training of counseling psychology students. Journal of Counseling Psychology, 49, 324-330.

Class 8 Hoyt, W., Imel, Z., & Chan, F. (2008). Multiple regression and correlation techniques: Recent controversies and best practices. Rehabilitation Psychology, 53, 321-339.

Class 13 Luke, D. (2004). Multilevel modeling. Sage: Thousand Oaks, CA.

Class 9 Miles, J., & Shevlin, M. (2001), Applying regression & correlation: A guide for students & researchers. Thousand Oaks, CA: Sage. Chapter 6, pp. 136-164.

Class 11 Nash, J. B., & Moroz, P. (1997). An examination of the factor structure of the computer attitude scale. Paper presented at the annual meeting of the American Educational Research Association, Chicago, IL., March 24-28, 1997. Retrieved from ERIC database.

Class 9 Roessler, R., Fitzgerald, S., Rumrill, P., & Koch, L. (2001). Determinants of employment status among people with multiple sclerosis. Rehabilitation Counseling Bulletin, 45, 31-39.

Class 10 Sherry, A. (2006). Discriminant analysis in counseling psychology research. The Counseling Psychologist, 34 (5), 661-683.

Class 5 Sodowsky, G. R., Kuo-Jackson, P., Richardson, M., & Corey, A. (1998). Correlates of self-reported multicultural competencies: Counselor multicultural social desirability, race, social inadequacy, locus of control racial ideology, and multicultural training. Journal of Counseling Psychology, 45(3), 256-264.

Class 11 Sodowsky, G., Taffe, R., Gutkin, T., & Wise, S. (1994). Development of the Multicultural Counseling Inventory: A self-report measure of multicultural competencies. Journal of Counseling Psychology, 41, 137-148.

Class 11 Spicer, J. (2005). Factor analysis. In Making sense of multivariate data analysis, Ch. 7, pp. 181-202. Thousdan Oaks, CA: Sage.

Class 10 Vaughn, B., & Wang, Q. (2008). Classification Based on Tree-Structured Allocation Rules. *Journal of Experimental Education*, 76(3) 315-340 **