This course outline is the property of NCSSS and the instructor and may be distributed only with written permission.

I. COURSE PURPOSE

The focus of the two semester courses (947-948 sequence) is on the multivariate statistics most commonly used in social work and in social science research. The overall goal of these two courses is to assist students in becoming both informed consumers and competent independent producers of data analysis in research. In addition, students are expected to gain an increased appreciation of the importance of statistics in the development of knowledge and the evaluation of human service programs and practice, and be able to recognize both the strengths and the limitations of the various statistical approaches in the context of research.

Focus for SSS 947 (fall semester):
The first course assumes that students have some minimal level of familiarity with bivariate statistical methods and the Statistical Package for Social Sciences (SPSS) software environment for conducting statistical analysis. This course addresses the most frequently used parametric and non-parametric statistical methods used to analyze mean comparisons, correlations, and frequency associations in the context of social research. This course also introduces students to multivariate analysis by exploring simple regression statistical technique followed by introduction to the Multiple Regression Analysis (MRA). In addition to class lectures and discussions, attention is also given to the conduct of statistical analysis in the SPSS software environment in class and homework assignments for practice. Although specific texts are used for guiding class contents, students are expected and encouraged to also use the web as a way to extend their awareness of knowledge that exists on the covered statistical methods.
II. EDUCATIONAL OBJECTIVES for SSS 947

Upon completion of SSS 947 course the students should be able to:

1. Formulate research questions and testable hypotheses, including null and alternate directional and non-directional hypotheses, and multivariate hypotheses.

2. Identify variables as independent, dependent, and intervening-control variables.

3. Distinguish between parametric and non-parametric statistical methods and the conditions for their use in social research.

4. Identify the statistical analysis appropriate for testing various hypotheses in relation to examining mean comparisons, correlations, frequency associations, and simple and multivariate variable prediction in social research.

5. Differentiate and explain assumptions that are expected to be met for conducting selected statistical tests.

6. Discuss and demonstrate how the selected statistical analysis is typically used or presented in social science research.

7. Conduct statistical analysis using SPSS software with accurate interpretation of results.

III. COURSE REQUIREMENTS FOR SSS 947

A. 1. Texts and Readings

Required texts for SSS 947


2. Notes for SSS 947

This course takes place in a computer lab-room and all students are expected to be familiar with CUA computer web environment, have CUA assigned password, and be able to access CUA Blackboard (BB). Please note that CUA uses IBM-SPSS versions 20+ on computers (currently on version 22 or 23), and typically every year updates to the next version of SPSS!
Bringing your laptop loaded with SPSS to class is permitted providing that you are knowledgeable about your own laptop environment, have pre-loaded SPSS that is in sync with CUA version for uploading/saving data, have power-point and WORD software, and are able to remotely and seamlessly connect to the CUA web for Blackboard (BB) access using your assigned CUA password. You can find and purchase SPSS software for personal use online or through CUA Barnes & Noble bookstore. For SSS 947, the graduate pack with Base version is fine, whereas for SSS 948, you need the Standard version of the graduate pack.

For support, please contact CUA Computing at 202-319-4357 (Help Desk). Please be aware that there is no “extra time” in class for dealing with technical laptop issues, and if such issues arise, you are expected to resolve these laptop issues outside of class, and use the classroom-provided desktop computers loaded with SPSS and other software. Also, please be aware that if you have older versions of SPSS (e.g., versions 17-21), then remember that the older versions of SPSS typically cannot read data saved in newer versions of SPSS (e.g. .22 at CUA), whereas newer versions can usually read older versions.

This class also regularly uses the CUA BB for storing class power-point slides, datasets, and other relevant research information. To gain access to BB, you must have CUA email address and password.

If you are very unfamiliar with the SPSS environment for basic computing prior to coming to this course, then it is a “good idea” to plan extra time for practice with basic commands for data entry, saving, and exporting data into pdf or rtf (WORD document) files. The length of time it takes individuals to competently engage in computer-based statistical analysis depends on many factors including level of comfort, ability to search and ask for help from multiple sources, ability to deal with frustration or fear of math problem-solving, and practice. Hence regular completion of weekly homework assignments provides ongoing practice to build knowledge and skills.

In addition, please be aware that conducting statistical analysis for homework assignments, and later for take-home graded tests, typically takes a considerably more time than often initially anticipated. In other words, computing and statistical analysis often takes more time than just simply reading a textbook or a research article, or answering written problem solving questions, and thus may require you to adjust your schedule for completing weekly homework on time.

In particular, during the week that is scheduled for a graded take-home test, please review your schedule ahead of time so that you can minimize disruptions, and particularly those related to work-related tasks or travel! The graded take-home tests have been scheduled in such a way as to maximize students’ accumulation of knowledge, and thus it is often not possible to reschedule them. If you are anticipating any difficulties in adhering to the planned course schedule, please make sure that you contact the instructor as soon as possible, and discuss what may or may not be possible. Missing of any classes is also highly discouraged and the student is expected to complete any missed work within...
reasonable time frame and with consultation with the instructor. Missing of any two or more classes in a row can severely jeopardize a student’s ability to complete this course.

*For additional step-by-step review on how to use SPSS*, please consider using the following paperback work-book texts from [http://www.pyrczak.com/](http://www.pyrczak.com/)


3. **Planning for SSS 948 in the spring semester**

*Anticipated required texts for class in SSS 948*


***Please do not purchase textbooks for SSS 948*** until you have conferred with the instructor by the end of the SSS 947 semester.

4. **Other Useful Reading Resources**


*Reading for fun on history of statistical tests and their development - consider:*

Reading on Informed Consent for research with human subjects – consider:

5. **Blackboard (BB) at CUA**

You need CUA-assigned password to login into CUA-BB. After you login-in into BB, and access the course, you will be able to download or access SPSS data files in a link under “Course Document” – folder called DATA that accompany the Abu-Bader text (These datasets for Abu-Bader book are also available directly from Lyceum website).

*Instructions For Access to CUA Blackboard (BB):*
For any technical issue regarding BB, please contact CUA Help Desk: 202/319-4357.
CUA BB: Entering from “outside of the university”:

- Step 1: Start with [http://www.cua.edu/](http://www.cua.edu/)
- Step 2: Go to the first tab “About CUA,” and Click on “Offices and Services”
- Step 3: Click on the link “Home at CUA” on the right side of the page
- Step 4: Click on the top bar that indicates “Blackboard”
- Step 5: Click on the link “Login to Blackboard”
- Step 6: Login using your CUA username and password
- Step 7: Enter Course SSS 947 (similar process is used for SSS 948)

**B. Course Grade and Grading Policy**
The grade in this course is based on a successful completion of assigned homeworks, three take-home examinations (tests), and class attendance and participation.

**Grade Distribution**
1. Test 1 (30%) Opens: After Class 04/ Due Class 05, Wednesday, 09.28.16
2. Test 2 (40%) Opens: After Class 10/ Due Class 11, Wednesday, 11.09.16
3. Test 3 (20%) Opens: After last class/ Due **Monday 12.12.16**
4. Class Homework completion (5%)
5. Class participation (5%)

Grade is based on CUA policy for graduate education in the NCSSS PhD Handbook:

- A = 95 – 100
- A- = 94 – 90
- B+ = 87 – 89
- B = 83 – 86
- B- = 80 – 82
- C = 79-70
- F = 69 >

Updated 6.23.2016
Please note that scoring B- or below grade on any of the tests places you at risk for a poor course grade result, and thus you are expected to set up an individual support review with the course instructor as soon as possible. Please be aware that if you score in the C range or below grade on Tests 1 and 2, you are also expected to meet with the instructor in person to review the test and address any other needs for support.

Please also note that full credit will NOT be given for test-assignments which are submitted late unless you have made prior arrangements with the instructor.

C. Course and Instructor Evaluation
NCSSS requires electronic evaluation of this course and the instructor. At the end of the semester, the evaluation form may be accessed at http://evaluations.cua.edu/evaluations using your CUA username and password. Additional informal written or verbal feedback to the instructor during the semester is encouraged and welcomed, and attempts will be made to respond to requests.

E. Class Expectations

1. Scholastic Expectations
Please refer to the NCSSS Announcements or appropriate Program Handbook for Academic Requirements, including scholastic and behavioral requirements. All written work should reflect the original thinking of the student-author, cite references where material is quoted or adapted from existing sources, adhere to APA format, and be carefully proofread by the student before submission to the instructor for grading.

2. Academic Honesty
Joining the community of scholars at CUA entails accepting the standards, living by those standards, and upholding them. Please refer to University Policy and appropriate Program Handbooks.

3. Accommodations
Students with physical, learning, psychological, or other disabilities wishing to request accommodations must identify with the Disability Support Services (DDS) at CUA and submit documentation of a disability to the course instructor: For support, please contact CUA phone: 202-319-5211, http://disabilityservices.cua.edu/. If you have documented such a disability to DSS, please arrange a meeting with the instructor as soon as possible to discuss possible accommodations.

4. Attendance/Participation
To assure successful engagement in this course, it is expected that students will conduct themselves in a professional manner, attend and participate actively during all classes, and complete all practice homeworks and graded tests on time. Students are also expected to read the designated assignments for each class session and to actively participate in class discussion and class-computational exercises.
*Please be aware* that the readings and practicing homework typically may take more time in this course and that you may need to *re-read* materials not only from the textbooks but also from different sources, and before *and* after-class as well. Often supplementary readings may be posted on BB as well.

*For any absence* (foreseen or unforeseen), students are expected to speak with the instructor as soon as possible and also provide a written email notice with a brief explanation for the absence. Following the absence, students are expected to utilize BB for completing all readings and assignments as outlined for classes.

*Unexcused or multiple absences* will result in a reduction of the final grade. Not attending class or not completing assignments on time due to work-related issues is *not* an acceptable excuse and will count as an unexcused absence unless prior arrangements are made with the instructor.

*Missing more than one class during the semester* significantly increases the student’s risk for course failure and should be avoided as much as possible. If a student expects to be absent for *more than once* during this course due to work-related (paid or unpaid) assignments or travel (that might be unavoidable), the student should consult with his or her academic advisor *and* the course instructor as soon as possible, and review plans for making up the required course work and address the suitability of participating in the course within the selected semester.

*Use of any electronic devices* during class *must be approved* by the instructor and is expected not to be disruptive to participants. All electronic devices are to be silenced or muted during class.

************************************************************************

SSS 947 - Multivariate statistics and Design I

COURSE SCHEDULE

Fall 2015

<table>
<thead>
<tr>
<th>DATE</th>
<th>TOPICS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Class 1</strong></td>
<td><strong>Overview and Introduction</strong></td>
</tr>
<tr>
<td>Wd 8.31.16</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Course requirements</td>
</tr>
<tr>
<td></td>
<td>• Starting statistical analysis</td>
</tr>
<tr>
<td></td>
<td>• Basic statistical concepts</td>
</tr>
<tr>
<td></td>
<td>• Scale of measurement and levels of variable measurement</td>
</tr>
<tr>
<td></td>
<td>• Typical relationships between two variables</td>
</tr>
<tr>
<td></td>
<td>• Frequency, relative frequency, relative percent, cumulative percent</td>
</tr>
<tr>
<td></td>
<td>• Common graphic displays</td>
</tr>
</tbody>
</table>

*Readings*

Updated 6.23.2016
Abu-Bader, 2011: Chapter 1: Overview of methodological terms; Chapter 2: Creating SPSS data files; Chapter 3: Data organization and summary.

Privitera, 2015: Chapter 1: Introduction to Statistics; Chapter 2: Summarizing data.

**Practice Homework**
Getting to know SPSS: Access Blackboard (BB) Folder Class 1: Complete Homework Exercise for Class 1, and upload your homework onto BB, ideally before next class.

<table>
<thead>
<tr>
<th>Class 2</th>
<th>Descriptive Statistics and Understanding Data Normality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wd 9.7.16</td>
<td>Review homework</td>
</tr>
<tr>
<td></td>
<td>Continue descriptive statistics</td>
</tr>
<tr>
<td></td>
<td>Class practice exercise</td>
</tr>
<tr>
<td></td>
<td>Measures of central tendency: Mean, median, mode</td>
</tr>
<tr>
<td></td>
<td>Measures of variability and dispersion: Standard deviation, variance</td>
</tr>
<tr>
<td></td>
<td>Differentiating population and sample computations</td>
</tr>
<tr>
<td></td>
<td>Data normality and properties</td>
</tr>
<tr>
<td></td>
<td>Normal curve and its proportions</td>
</tr>
<tr>
<td></td>
<td>Skewed distributions and corrections</td>
</tr>
</tbody>
</table>

**Readings**
Abu-Bader, 2011: Chapter 4: Descriptive Statistics: Measures of central tendency variability, and percentiles; Chapter 5: Normality of distributions, data transformations, and standard scores.

Privitera, 2015: Chapter 3: Summarizing data – Central tendency; Chapter 4: Summarizing data – variability

**Practice Homework**
Use Abu-Bader (2011): See page 109 (Chapter 4): (a) Complete Practical Exercise Part II items 1-5 using SPSS; (b) Access WELFARE data and run frequencies, and examine normality/skewness of AGE, CESD, and SUPPORT variables and correct their skews showing all steps in an organized manner!


<table>
<thead>
<tr>
<th>Class 3</th>
<th>Continue Data Normality and Z-scores Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.14.16</td>
<td>Review homework</td>
</tr>
<tr>
<td></td>
<td>Data transformations</td>
</tr>
<tr>
<td></td>
<td>Class practice exercise</td>
</tr>
<tr>
<td></td>
<td>Standard scores (z scores) and properties</td>
</tr>
</tbody>
</table>

Updated 6.23.2016
• Reading z score Table
• Standard error of the mean

Readings
Abu-Bader, 2011: Chapter 5: Continued


Practice Homework

Privitera (2015): Chapter 6: page 195 – problem #13, page 196 - problem #20, and page 197 – problem #28; Chapter 7: page 227 – problem #23 (a,b, only) and problem #24 (a,b only).

Class 4 Hypothesis Testing and Selecting a Statistical Test 9.21.16

• Understanding the common process in hypothesis testing
• Understanding the null and alternate, and one-and two-tailed research hypotheses
• Errors in hypothesis testing
• Confidence intervals
• Class practice exercise using the z-test
• Selecting parametric and nonparametric tests

Readings
Abu-Bader, 2011: Chapter 6: Hypothesis testing and selecting a statistical test.


Practice Homework
Privitera (2015): Chapter 8: page 261: #18, 20, 22, and 24

Class 5 TEST 1: Take Home Exam is accessible through Blackboard (BB) - Under Assignment Link. Class time is used for test completion. OPENS on BB on 9.22.16 and is DUE by upload to BB by 11:30pm.

Updated 6.23.2016
Class 6  **Bivariate Correlations**  
Wd 10.5.16

- Assumptions underlying Pearson r
- Coefficient of determination
- Scatterplot
- Nonparametric Spearman rho
- Interpretation of results using SPSS

**Readings**

Privitera, 2015: Chapter 15: Correlation

**Practice Homework**
Homework exercises from Abu-Bader and Privitera books are located on a document: Class 6_Homework_Correlations_Students, located in class 6 folder on BB.

Class 7  **Group Comparisons – Two Independent Groups**  
Wd 10.12.16

- Assumptions underlying the independent t-test
- Difference between z-test and t-test
- One-sample t and two-independent samples t
- Effect size
- Nonparametric Mann-Whitney U test
- Interpretation of results using SPSS

**Readings**

Also, please review APA-6 Manual for constructing appropriate style tables for displaying data.


**Practice Homework**
Abu-Bader (2011): Page 218: Use Job Satisfaction data, and complete practical exercise Part 1 including a summary APA-6 table (but skip the syntax writing).

Privitera (2015): Chapter 9: #11, 12, 17 (page 292), #20 (Page 293), # 29 (page 294), and # 31 (Page 295).

Updated 6.23.2016
**Class 8**  
**Group Comparisons: Related Two Groups**  
Wd 10.19.16

- Assumptions underlying the dependent t-test
- Matched -pairs design
- Repeated measures design
- Effect size
- Nonparametric Wilcoxon Signed Ranks test
- Interpretation of results using SPSS

**Readings**


**Practice Homework**

Privitera (2015): Chapter 10: Page 319 - # 13, # 18, # 19 (use SPSS for analysis), page 321-322 # 22 (use SPSS for analysis), and 322 # 30.

**Class 9**  
**Group Comparisons – 3+ Independent Groups**  
Wd 10.26.16

- Assumptions underlying ANOVA
- Post Hoc Tests
- Nonparametric Kruskal-Wallis H test
- Interpretation of results using SPSS

**Readings**
Abu-Bader, 2011: Chapter 10: K Group Means, ANOVA, Kruskal-Wallis, Post Hoc tests (skip over One Way ANCOVA discussion)


**Practice Homework**

## Class 10
**Association between Two Categorical Variables**

**Wd 11.02.16**

- Creating contingency tables and how to read them in SPSS
- Assumptions underlying Chi-square test
- Difference between observed and expected frequencies
- Phi and Cramer’s V coefficients
- Interpretation of results using SPSS

**Readings**

Abu-Bader, 2011: Chapter 11: Chi-Square test of Association

Privitera, 2015: Chapter 17: Nonparametric tests - Chi-square tests.

**Practice Homework**


---

## Class 11
**TEST 2:** Take Home Exam is accessible through Blackboard (BB) - Under Assignment Link. Class time is used for test completion.

**Wd 11.09.16**

- OPENS on BB on 11.03.16 and is DUE by upload to BB by 11:30pm.

---

## Class 12
**Starting Regression Analysis (MRA-1)**

**Wd 11.16.16**

- Review correlational analysis
- Introduce the purpose of regression analysis
- Understanding simple regression
- SPSS process for simple regression
- Simple regression equation and its relationship to MRA
- Scatter plot
- Main coefficients produced by simple regression and MRA
- Assumptions underlying MRA
- Selecting appropriate factors for MRA

**Readings**

Abu-Bader, 2011: Chapter 12: Multiple Regression Analysis, pages 316-325 only. Practical example 325-337 for testing assumptions only!


**Practice Homework**

Updated 6.23.2016
Abu-Bader (2011): See page 350 (Ch.12): Practical Exercise with Elderly data, item 1 only and do preliminary testing of variables to examine which variables may meet assumptions in order to be included in MRA.

Privitera (2015): Chapter 16: See page 560 - # 17, 18, and 19, and page 561 - # 24, and page 562 - # 26 (use SPSS for analysis).

---

**Wd 11.23.16**

Thanksgiving Recess – No Class

---

**Class 13**  Continue Multiple Regression Analysis (MRA-2)

Wd 11.30.16

- Review homework
- Methods for conducting MRA analysis
- Dummy-coding nominal variables
- Executing MRA in SPSS
- Interpreting results

**Readings**

Abu-Bader, 2011: Chapter 12: Multiple Regression Analysis: Please complete the whole chapter.

Privitera, 2015: Chapter 16: Please complete the whole chapter.

**Practice Homework**

Abu-Bader (2011): See page 350 (Ch.12): Continue with the Practical Exercise and run the MRA analysis, interpret results, and do items 4 and 5.


---

**Class 14**  Multiple Regression Analysis (MRA-3)

12.07.16

- Last Class
- Review and practice MRA
- Review for final exam.

**TEST 3**

Take Home Exam is accessible through Blackboard (BB): OPENS on BB on 12.08.16 and is DUE by upload to BB 11:30pm, Monday 12.12.16!

---

THE END. THANK YOU. HAPPY WINTER HOLIDAYS!

Updated 6.23.2016