Department of Criminal Justice and Criminology

CRIJ7442.01 Advanced Statistics I Fall 2017

Professor: Yan Zhang, Ph.D. Office: C-221 Phone: 936-294-3034 Email: zhangyan@shsu.edu Class Hours: Tuesday 9:00 am – 11:50 am Class Room: CJA-111 Office Hours: Monday 9:00 am – 10: 00 am; Tuesday 1:30 pm – 2:30 pm; or by appointment

Required Text

Mertler, Craig A., and Rachel Vannatta Reinhart. 2016. Advanced and Multivariate Statistical Methods: Practical Application and Interpretation, 6 edition. Routledge.

Recommended Text:

Agresti, Alan. 2017. Statistical Methods for the Social Sciences, 5th Edition. Pearson.

Further required/recommended readings will be provided through the blackboard system.

Course Description:

This course is designed to introduce students to a wide range of multivariate statistical techniques used in criminal justice and criminology field. Topics include aspects of multivariate data analysis, multivariate linear regression and regression diagnostics, factor and principal components analysis, logistic regression, and regression modeling for other categorical responses. The use of SPSS software package for data analysis will be an integral part of the course. Throughout the course, considerable emphasis will be placed on practical application and interpretation of the statistical procedures covered.

Prerequisite: CRIJ 6385 or an equivalent course.

Course Objectives

Upon completion of the course, the student should be able to:

• Understand the basic concepts of multivariate analysis

- Conduct data examination and understand the basic characteristics of the underlying data and relationships
- Interpret the research literature and
- Apply multivariate methods in her/his own research appropriately

Course Requirements

Class lectures are not intended to be your only source of information for this course. It is very important that you read all the outlined chapters, review these chapters as necessary, and seek other materials that could supplement your knowledge or assist you in better understanding the materials we are covering in class. You are encouraged to form study groups with other members of the class, but you need to work independently on required tasks such as the assignments and research project.

Students are expected to demonstrate your critical engagement with the readings and issues of quantitative criminal justice and criminology research through questions, presentations and discussion in class, and project completion. Students are expected to keep up with the readings and to complete assignments on time. Late assignments will not be accepted. If you cannot complete assignments on time due to an emergency, you must let me know before the assignment is due if this is humanly possible.

SPSS Software and Data

This course relies on SPSS software. You can access the software in the computer lab. Datasets for your research projects will be provided as needed. Please note that datasets used in this course should not be shared or otherwise distributed to people outside of the course without permission from the instructor.

Your grade for this course will be comprised of three parts:

• Participation and Article Review: (20 points)

There will be 5 discussion sections leaded by students. Each student will select one research article that uses one of the major multivariate analysis techniques, review the article, and lead the discussion of the topic. When preparing the review, please focus on: 1) research questions and hypothesis; 2) dataset, sampling methods and measures of the major variables; 3) Statistical methods; and 4) the results and interpretation of the results. Try to think if the methodology used in the analysis is appropriate and sufficient to test the research questions. If not, what would be a better approach?

• Four Assignments (20 points each)

There will be four assignments based on different statistical models. These assignments are intended to help you to understand the statistical methods and learn how to use SPSS. While you are encouraged to work together and help each other in learning SPSS and interpreting the results, you need to complete your assignments independently.

Each assignment will be written as a research note, consisting of (1) a brief statement of the research question(s) and/or hypotheses being examined, (2) a description of the data being used for the analysis, (3) a description for the statistical technique(s) being used for the analysis, (4) a presentation of the results in appropriate tables or figures, with a written interpretation of the results for each research question or hypothesis, and (5) computer output relevant to the analysis, attached as an appendix.

Assignments must be turned in at the beginning of class on the day they are due or they will be considered late. For each day that an assignment is late (regardless of the reason), two points will be subtracted from the grade.

• Two exams (50 points each).

There are two exams scheduled during the course of the semester. Each exam will consist mainly of short answer questions. Exams will focus on your conceptual understanding of the material, including interpretations from SPSS output. You will also perform some statistical analysis using SPSS software.

Grading:

89.5—above A 79.5—89.4 B 69.6—79.4 C

Make-up Exam Policy: If you miss a scheduled exam for any reason, the makeup exam must be completed within one week of the originally scheduled exam. A time for the makeup will be determined as is convenient for the student and the professor. Written documentation of the reason for missing the exam must be provided.

Student Academic Policies concerning Attendance, Academic Honesty, Disabled Student and Services for Disabled Students, and Absences on Religious Holy days may be found at:

http://www.shsu.edu/dept/academic-affairs/aps/aps-students.html.

Use of Telephones and Text Messages in Academic Classrooms and Facilities: http://www.shsu.edu/dept/academic-affairs/aps/aps-curriculum.html

Course Schedule:

The reading material listed for each lecture should be read before attending that class. Extra readings will be posted on blackboard. This schedule is subject to change over the course of the semester. Advance notice of changes will be announced during class.

Week 1	Introduction	Mertler ch. 1	
Aug 29	Review of Univariate and Bivariate Analysis		
Week 2 Sep 5	Introduction to Multivariate Relationships	Mertler Ch. 2 Agresti Ch. 10	
Week 3 Sep 12	Examination of the Data: Graphical examination of the data; Missing data; outlier.	Mertler ch. 3	
Week 4 Sep 19	Examination of the Data: Testing the assumptions of multivariate analysis	Mertler ch. 3	Article review 1 Assignment 1- assigned
Week 5 Sep 26	Multiple Regression	Mertler Ch. 7	
Week 6 Oct 3	Regression with Categorical Predictors: Analysis of Variance and Covariance	Mertler Chs 4&5 Agresti Ch. 12	
Week 7 Oct 10	Multiple Regression with Quantitative and Categorical Predictors	Agresti Ch. 14	Article review 2 Assignment 2- assigned
Week 8 Oct 17	Model Building with Multiple Regression	Mertler Ch. 7 Agresti Ch. 14	
Week 9 Oct 24	Exam I		
Week 10 Oct 31	Factor analysis	Mertler Ch. 9 Agresti Ch. 16.5	
Week 11 Nov 7	Factor analysis	Blackboard	Article review 3 Assignment 3- assigned
Week 12 Nov 14	Logistic Regression	Mertler ch. 11 Agresti ch. 15	
Week 13 Nov 21	Logistic Regression	Blackboard	Article review 4 & 5 Assignment 4- assigned
Week 14 Nov 28	General Regression Analysis	Blackboard	
Week 15 Dec 5	Final Exam 9:00 -11:50 am		

Reading List:

- 1. Tarling, Roger. 1986. Statistical Applications in Criminology. *Journal of the Royal Statistical Society*. Series D (The Statistician), Vol. 35, No. 3, pp. 369-388.
- 2. Petrocelli, Matthew, Alexx R. Piquero, and Michael R. Smith. 2003. Conflict theory and racial profiling: An empirical analysis of police traffic stop data. *Journal of Criminal Justice*. 31:1-11. –**OLS**
- 3. Novak, Kenneth J., and Mitchell B. Chamlin. 2012. Racial threat, suspicion, and police behavior: The impact of race and place in traffic enforcement. Crime & Delinquency. 58 (2):275-300. –**OLS**
- 4. Grasmick, Harold G., Tittle, Charles R., Bursik, Jr, Robert J., and Arneklev, Bruce J. 1993. Testing the core empirical implications of Gottfredson and Hirschi's general theory of crime. *Journal of Research in Crime & Delinquency*. Vol. 30 Issue 1, p5-29. –**Factor Analysis and OLS**
- King, Ryan. 2007. The context of minority group threat: race, institutions, and complying with hate crime law. Law & Society Review. Vol. 41, No. 1, pp. 189-224. –Logistic Regression
- Pezzella, Frank S., and Matthew D. Fetzer. 2017. The likelihood of injury among bias crimes: An analysis of general and specific bias types. Journal of Interpersonal violence. Vol. 32 (5): 703-729. –Logistic Regression
- Green, Donald P., Dara Z. Strolovitch and Janelle S. Wong. Defended Neighborhoods, Integration, and Racially Motivated Crime. American Journal of Sociology, Vol. 104, No. 2, pp. 372-403. –Negative Binomial Regression