BUS 706: Intro Grad Statistics

AB 105

Monday: 9-11:50am

**Instructor:** Dan Jones, PhD **TA:** Edit Szabo, PhD

**Office:** ASB 401i **Office:** Judicial College offices

**Office Hours: Thur 10am or** **Lab sessions:** TBD

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# Course Description:

This course is designed to provide graduate students in Management with an on-ramp for thinking about and understanding statistical approaches and statistical argumentation. Through this course, you should be able to have a solid foundation for not only applying basic GLM and multivariate approaches, but also have a foundation for learning additional statistics and quantitative argumentation in the future. Although the focus is on **GLM**, you should walk away with a generalized “**toolkit**” for understanding different statistical approaches, when and why you would use them, and how to interpret the output. You will also gain theory of science knowledge and understand the logic behind choices of statistical tests and what they mean. Further, you should know what you “do not know” in terms of why more advanced techniques are needed and the assumptions that are violated when applying basic GLM inappropriately. Finally, we will cover a basic introduction to scale construction and latent variables as applied to validity and validation, nomological nets, construct validation, etc. Real data applications and swimming will be encouraged as well as application, interpretation, exploration, and analyses of your own datasets.

# Course Learning Objectives:

There are four overall foci to the course, each with separate objectives:

* Objective 1: Logic, Theory, and Argumentation
  + Students should be able to logically explain why a statistical test is appropriate or inappropriate based on the purpose of the test and philosophy behind it
  + Students should be able to understand the *basic* computational and mathematical assumptions behind foundational concepts of GLM.
* Objective 2: Toolbox selection
  + Students should be able to understand what statistical test to choose in a given dataset with a specific question.
  + Students should be able to “know what they do and do not know” with basic methodological constraints\
* Objective 3: GLM understanding
  + Students should be able to understand the basic tenets, variations, and assumptions behind the General Linear Model (GLM). In this objective, we will cover chapters 1-9 of Cohen et al., 2003, and learn how to select different regression models, understand non-normality and non-linearity, multivariate regression, and mediation / moderation concepts and applications.
* Objective 4: Validity / Validation
  + Finally, students will be *introduced* to the concepts of validity and validation of constructs and scale construction. Although scale construction is not universally applicable, the concept of validity and construct validation is. We will cover strong inference, theoretical approaches, and strong methodolo9gical approaches with concomitant statistical approaches.

# Strongly Recommended Texts:

# Cohen, Cohen, West, & Aiken (2003). Applied Multiple Regression / Correlation Analysis for the Behavioral Sciences

# Recommended Supplementary Texts:

* *Explaining Psychological Statistics*, 4th edition, by Cohen. E-copy available via KC.
* *Discovering Statistics Using R*, by Field, Miles, & Field.

# Software:

Most homework assignments in this course will require the use of SPSS statistics package. However, you are free to conduct the analyses with any package of your choice. Examples and limited training in R throughout the course is available by request. You can download R at <http://www.r-project.org/>, and R-Studio at [http://www.rstudio.](http://www.rstudio.com/) [com/](http://www.rstudio.com/).

# Grading:

* **Homework:** 25%
* **Content summary essay:** 15% Feb 16 by 12pm

# Results write-up (own data): 15% May 8 (12pm)

* **Exam 1:** 20%, Monday, Feb 24
* **Exam 2:** 20%, Monday, April 6
* **Exam 3:** 20%, Finals day (see schedule)

# Homework:

The main purpose of all homework assignments in PSY 706 is to help you practice and master the course material. It is often an opportunity for you to analyze, or *strategize* about analyzing, your own data. All homework assignments will be posted in class, on [Canvas](http://wcl.unr.edu/), or both. Due dates are typically Friday, but we can discuss an optimal time. No late homework will be accepted, but your lowest homework score will not be used to compute your grade.

Answers to homework assignments should be written neatly or typed and well organized. You are welcome to work with other students on homework problems. However, a declaration must be made that includes who you worked with, contributions (e.g., how you complemented each other), and such. You must, regardless, write your own answers to the questions. Copying other’s work is ***plagiarism***.

# Texbook Recommendations:

Your performance will be the strongest if you read Chapters 2-9 in Cohen et al., 2003). Chapters 1 and 10 are great, but some have limited time.

# Exams:

There will be two midterms and a final exam. The exams will not involve the use of the computer, but sections of the exams will require interpreting computer output. The exams will also require that you work with the computer output in order to answer research questions. At least part of each exam will be cumulative. No make-up exams will be given unless circumstances are exceptional. The final is your minimum grade. Meaning that if you get a 40% on the first two exams (for example), but get a 100% on the final exam, you get a 100% as your average.

# Accommodations:

Any student with a disability needing academic adjustments or accommodations is requested to speak with the [Disability Resource Center](http://www.unr.edu/drc) (Pennington Student Achievement Center, Suite 230) as soon as possible to arrange for appropriate accommodations.

# Academic Dishonesty:

Cheating, plagiarism or otherwise obtaining grades under false pretenses constitute academic dishonesty according to the code of this university. Academic dishonesty will not be tolerated and penalties can include canceling a student’s enrollment without a grade, giving an F for the course, or giving an F for the assignment. For more details, see the [University of Nevada, Reno General Catalog](http://catalog.unr.edu/).

# Audio and Video Recording:

Surreptitious or covert video-taping of class or unauthorized audio recording of class is prohibited by law and by the Board of Regents policy. This class may be videotaped or audio recorded only with the written permission of the instructor. IF reminded and desired, I can record my own lectures and classes. I reserve sole rights to these recordings, however. In order to accommodate students with disabilities, some students may be given permission to record class lectures and discussions. Therefore, students should understand that their comments during class may be recorded.

# Academic Success Services:

Your student fees cover usage of the Math Center (775-784-4422), Tutoring Center (775-784-6801), and University Writing Center (775-784-6030). These centers support your classroom learning; it is your responsibility to take advantage of their services. Keep in mind that seeking help outside of class is the sign of a responsible and successful student.

# Tentative Course Schedule:

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| **Week** | **Date** | **Topics** | **Readings** |
| 1 |  | Test logic and statistical argumentation, Theory of Science | Popper, Cohen, Cohen |
| 2 |  | Statistical assumptions, philosophy, and Theory of Science | Cohen et al |
| 3 |  | Basic Equations in Statistics | Cohen et al |
| 4 |  | Statistical selection and data understanding – toolbox and SPSS practice |  |
| 5 |  | Bivariate correlation and Regression \*content summary essay |  |
| 6 |  | Categorical & Non-linear regression |  |
| 7 |  | Statistical Moderation & Mediation in PROCESS |  |
| 8 |  | Statistical Moderation & Mediation in PROCESS |  |
| 9 |  | Exam 1 & Catching up? |  |
| 10 |  | BYOD (Bring your own data) |  |
| 11 |  | Validity / Validation Assumptions  Scale construction |  |
| 12 |  | **Principal Components, Exploratory Factor Analysis, Reliability / consistency** |  |
| 13 |  | Confirmatory Factor analysis and Intro to latent variables |  |
| 14 |  | Flex Day |  |
| 15 |  | Flex Day |  |
| 16 |  | Final Exam |  |
| 17 |  | **Final Exam (9:50-11:50 am)** |  |