

# Multivariate Statistics: A Project-Based Course

PSY 4450



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**Department of Psychology**  
**Metropolitan State University of Denver**

**Office Hours:** Monday & Wednesday  
8-9:00 a.m., 11-12:00 p.m., & 2:30-3:00 p.m.

**OR JUST COME ON BY!!!**

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## Catalog Course Description

This course offers study of multivariate statistics such as multiple regression, factor analysis, discriminate analysis, and multivariate analysis of variance. Students will learn how to use the Statistical Package for the Social Sciences (SPSS) to perform the necessary statistical tests. Emphasis will be on understanding, application, and interpretation of multivariate statistics.

$$Y = a + bX$$

$$Y = (\bar{Y} - b\bar{X}) + bX$$

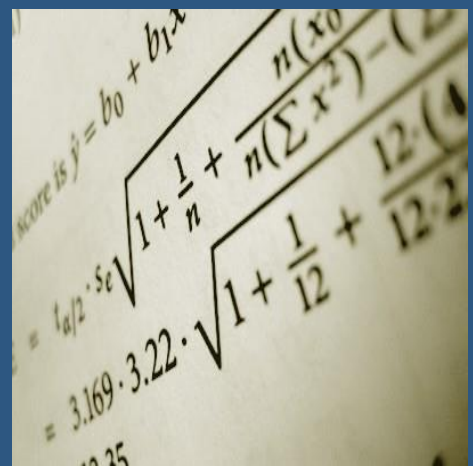
$$Y = \bar{Y} + b(X - \bar{X})$$

$$Y = \bar{Y} + bx$$

## Student Learning Objectives

1. Become a critical consumer of statistics by understanding the common analyses used in psychology research (assessed by SPSS Assignments).
2. To be able to appropriately and accurately apply statistical knowledge to solve problems (assessed by SPSS and Project-Based assignments).
3. Be able to read, understand, and integrate psychological research (assessed by Project-Based Introduction and Discussion Assignments).
4. Understand the importance of scientific problem solving (assessed by Project-Based Assignments).
5. To understand the ethical considerations involved in conducting research (assessed by Human Subjects Assignment).
6. To experience the research process by conducting a research experiment (assessed by Project-Based Assignment).
7. Demonstrate the ability to work collaboratively with peers (assessed by peer-group assignment).

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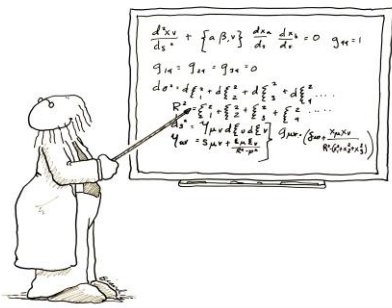
## Expectations for Students & Instructor

### Student Expectations

- a. PLEASE BE ACTIVE AND PARTICIPATE IN CLASS
- b. Listen and respect others
- c. Be comfortable in taking risks
- d. Complete all assignments
- e. Turn off your cell phones and/or pagers
- f. Be punctual for all classes
- g. Discuss class concerns either after class or during designated office hours
- h. Be prepared for class by reading chapter prior to lesson

### Instructor Expectations

- a. BE ACTIVE AND ENTHUSIASTIC TO FACILITATE STUDENT LEARNING
- b. Listen and respect students' views
- c. Be in class at least 5 minutes before and after class
- d. Respond swiftly and effectively to student concerns
- e. Turn off cell phone
- f. Grade objectively, consistently, and timely
- g. Be prepared for class
- h. Accommodate differences in students' learning



*It is the mark of a truly intelligent person to be moved by statistics.*  
~George Bernard Shaw

$$Var(x) = \frac{\sum_{i=1}^N (x_i - \bar{x})^2}{N}$$

Please remember if you have any questions, concerns, or comments to let me know right away. I welcome any feedback you're willing to offer.

## Teaching Philosophy

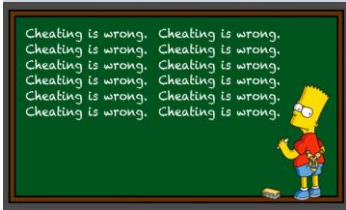
In line with my student and teacher expectations, my teaching philosophy and method's are important to understand in order to succeed in this course.

1. I vary my teaching methods to insure that our courses are accessible to all students. I utilize lecture, active class discussion, cooperative small group activities, problem-based learning activities and classroom demonstrations and observations. As such, class lectures and tutorials will be provided in multiple modalities: (a) PowerPoint presentations, (b) overheads, (c) videos, (d) assigned reading, (e) handouts, (f) wipe boards, and (g) reflective practices to provide students with a learning environment that accommodates their individuality
2. I believe in transparency, meaning I have nothing to hide from you and you have nothing to hide from me. I will explain the methods and grading and if you have any questions please respectfully ask. I expect the same honesty from you. Together we can build and maintain a successful semester.
3. Everyone has the right and ability to be successful in this course. I will provide you with multiple pathways to achieve success you just have to follow through on them. Take charge of your learning, it is your responsibility.
4. I try to infuse each course with diversity. The need for a diversified education is increasing with our growing multicultural society. In my courses I promote a safe climate where we examine content from multiple cultural perspectives.
5. Foremost, I believe in student-centered active learning. Students bring a wealth of personal experiences, knowledge, and theories to the classroom and if you can relate new information to your personal experiences through an active learning method, not only is your learning greatly enhanced, but more importantly your higher-level thinking skills are also improved.

## Texts

Abu-Bader, S. H. (2010) *Advanced and multivariate statistical methods for social science research*. Chicago, IL: Lyceum Books.

Schwartz, B. M., Landrum, R. E., & Gurung, R. A. (2012). *An easyguide to APA style*. Los Angeles, CA: Sage.



There are lies,  
damned lies and  
statistics.

~Mark Twain

## Human Relations

As stated in the American Psychological Association (APA) ethics code, I as the instructor and you as the student **will not** engage in any unfair discrimination based on age, gender, gender identity, race, ethnicity, culture, national origin, religion, sexual orientation, socioeconomic status, or any basis proscribed by law. In the content of this course I will often address issues of gender, sexual orientation and culture. To promote a safe learning environment I will expect you to strictly adhere to the above APA code.

## Academic Integrity & Honesty

It is my policy, and the college's policy that cheating and plagiarism are strictly prohibited. Any student that is caught cheating on an exam or plagiarizing on a paper will be reported to the academic dean. If you put an idea, statistics, or quote in your paper that is from another source, absolutely cite the source. If you do not cite a direct quote or even a paraphrased quote, this will be considered plagiarism and you will receive either an F in the course or an F on the paper and your actions will be reported to college officials. **Moral of the story, cite and reference your work excessively.**



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# PLAGIARISM REPORT

WEB SOURCES FOR UNORIGINAL CONTENT IN STUDENT WRITING

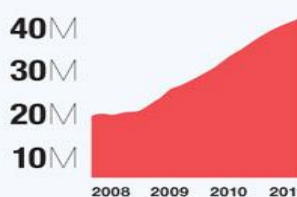
We live in a digital culture where norms around copying, reuse and sharing are colliding with core principles of academic integrity.

## TRENDS



According to a recent Pew Center survey of College Presidents, plagiarism is a growing problem.

Source: Pew Research, 2011



Students submit over 40 million papers per year to Turnitin, providing a unique look into the world of plagiarism.

Source: Company Data, 2011

WHY WE DECIDED TO CREATE THIS REPORT.



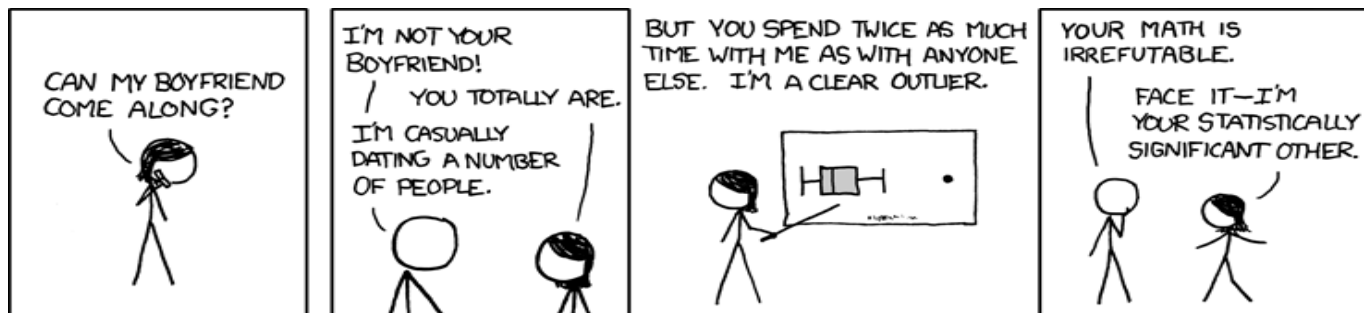
## American Disabilities Act (ADA) Compliance

If there is any student who has special needs because of a disability, please go directly to the Access Center for Disability Accommodations & Adaptive Technology at the Auraria Library, Suite 116. Office hours are held between 7:30am and 5:00pm Monday through Friday. You could also contact them at 303-556-8387 or email [mscd-accesscenter@msudenver.edu](mailto:mscd-accesscenter@msudenver.edu). You must do this to report your needs and to provide me documentation of your disability for certification. Please feel free to discuss this issue in private if you need more information.



## Attendance Policy

Attendance will benefit you in several ways. Primarily, your understanding of the course material is heightened from double exposure to the material (i.e., in class and in the text). Second, you are responsible for all information presented in class even on days that you are absent. If absences are necessary, please contact me BEFORE the class. Absences will only be excused if I am contacted prior to class period and for appropriate reasons. In addition, each constructivist lesson missed is 1% off your final grade.



## Class Assignments

- I. **Human Subjects Research Training Assignment (due January 30<sup>th</sup>):** In this assignment, I intend to have you complete MSU Denver's required training for ethical treatment of human subjects in order to interact with research participants. This assignment cannot be skipped because you will be collecting data from human subjects.
- II. **SPSS Assignments:** For each of the SPSS assignments (75 points each), you will participate in a hands-on activity and learn how to navigate SPSS, conduct various analyses using SPSS, data-prescreening techniques, and how to write your results for each analysis in APA style.
  1. **SPSS 101 (75 points; due February 13<sup>th</sup>)**
  2. **SPSS Simple Linear Regression (75 points; February 27<sup>th</sup>)**
  3. **SPSS Multiple Regression (75 points; due March 20<sup>th</sup>)**
  4. **SPSS Factorial ANOVA (75 points; due April 10<sup>th</sup>)**
  5. **SPSS Repeated Measures ANOVA (75 points; due April 24<sup>th</sup>)**
  6. **SPSS MANOVA (75 points; due May 8<sup>th</sup>)**
- III. **Project-Based Learning Assignment:** This is a group project-based learning assignment designed to assess your ability to carry-out (from start to finish) a scientific investigation of psychological phenomena. The goal to create an assignment that that helps you develop intrinsic motivation, collaborative skills, flexible and effective problem solving skills, and ultimately self-directed learning. Additionally, it is my intent to provide you with the opportunity to solve real-world problems. For this particular assignment, I will be working side-by-side with you to assist in framing questions and structuring the scientific investigation while providing critical feedback to you on the process.
  1. **Introduction & Method Assignment (100 points; due February 20<sup>th</sup>)**
  2. **Results & Discussion Assignment (100 points; due April 3<sup>rd</sup>)**
  3. **Final Draft Assignment (150 points; May 1<sup>st</sup>)**
  4. **Group Presentation Assignment (100 points; May 15<sup>th</sup>)**
  5. **Peer-Group Grade Assignment (50 points; May 15<sup>th</sup>)**

## Grading Policies

Assignment	Assessments			Grading Scale	
	Points	% of Total	Learning Objectives	Points	Letter Grade Equivalent
<b>Human Subjects Research</b>	50	35%	5	1000-900	A
<b>(6) SPSS Assignments</b>	450	45%	1, 2, & 6	899-800	B
<b>(5) Project-Based Learning</b>	500	50%	2-7	799-700	C
<b>TOTAL</b>	1000	100%		699-600	D
				599 or less	F



## Course Calendar

WEEK OF	TOPIC	ASSIGNMENTS DUE
1/23	Introductions	N/A
1/28	Review of Statistics (Ch. 1)	CITI Training
2/4	Data Screening (Ch. 2)	N/A
2/11	Data Screening (Ch. 2)	SPSS 101 & Data Screening
2/18	Simple Regression (Ch. 3)	Introduction & Method
2/25	Simple Regression (Ch. 3)	SPSS Simple Regression
3/4	TBA	N/A
3/11	Multiple Regression (Ch. 4)	N/A
3/18	Multiple Regression (Ch. 4)	SPSS Multiple Regression
3/25	<b>SPRING BREAK, YAHOO!</b>	<b>SPRING BREAK, YAHOO!</b>
4/1	Factorial ANOVA (Chs. 6-7)	Results & Discussion
4/8	Factorial ANOVA (Chs. 6-7)	SPSS Factorial ANOVA & RMPA Presentation
4/15	Repeated Measures ANOVA (Ch. 8)	N/A
4/22	Repeated Measures ANOVA (Ch. 8)	SPSS Repeated Measures ANOVA
4/29	MANOVA (Ch. 9)	Final Paper
5/6	MANOVA (Ch. 9)	SPSS MANOVA
5/15	<b>Oral Presentations</b>	<b>Oral Presentations</b>

*Note. This calendar is subject to change at my discretion.*