COM 682: Multivariate Statistics

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Course description:

This course offers an overview of applied regression, analysis of variance, factor analysis and related statistical techniques commonly used in social/behavioral research. Such techniques are often used in the analysis of surveys/questionnaire data, experiments, and secondary data from a wide variety of sources. This class assumes students have had a basic graduate level quantitative/statistical reasoning class and will build upon standard bivariate analyses, such as t-tests and correlations, to approach the analysis of data with multiple independent and/or dependent variables. The class will serve as a foundation for more advanced statistical courses in topics such as structural equation modeling or multilevel modeling. For mixed methodologists, this class may serve as the final quantitative analysis course.

Requirement:

Field, A. (2017). *Discovering statistics using SPSS* (5th edition). Los Angeles: Sage.

Learning objectives and competencies:

Learning objectives: By the conclusion of this course, you should be able to:

- Understand basic assumptions that underlie ANOVA, factor analysis, multiple regression, and related methods.
- Identify the appropriate types of tests required to test different types of hypotheses and answer common types of research questions.
- Develop skills in the management of quantitative data (inputting data, importing/exporting data, computing variables, recoding variables, etc.)
- Demonstrate the ability to conduct, interpret and communicate results of statistical procedures covered in this class.
- Develop skills at presenting data visually through appropriate charts and tables.

Assessment and evaluation:

Grading policies: In this course, you will have three primary tasks: weekly assignments, exams, and a final project. You will earn a grade in this course based on your ability to successfully complete these tasks.

All data reporting in assignment submissions should be formatted in accordance with APA style (no particular edition required).

It is your responsibility to check your grades throughout the semester. Possible errors must be reported to me within 10 days of being input to Brightspace. After this 10-day period, grades will be considered final.

Final grades are non-negotiable.

Grade categories:

- Weekly assignments: 10 x 2 points each = 20 points
  - For each week of the class, you will complete an assignment that showcases your understanding of the content for that week. These will be due at the end of the Friday session (2:20 p.m. ET), with the expectation that you can complete these assignments during that session – though you're welcome to complete them before then.
- Exams: 3 x 15 points each = 45 points
  - You will complete three exams that will evaluate your understanding of the content of the course.
- Final project: 35 points
  - In your final project, you will conduct independent analysis of data to address one or more research questions and/or hypotheses. I will provide data that you can use to analyze for this project, but I would encourage you to try to acquire your own dataset to analyze. The project should also provide (brief) theoretical rationale for the analyses that you present. This project includes two steps:
    - Initial proposal: 5 points
    - Final project: 30 points

Final grade determination: Final grades will be converted to letter grades based on this scale:

A+ = 100 - 97	B- = 82.99 - 80	D = 66.99 - 63
A = 96.99 - 93	C+ = 79.99 - 77	D- = 62.99 - 60
A- = 92.99 - 90	C = 76.99 – 73	F = 59.99 and below
B+ = 89.99 - 87	C- = 72.99 - 70	
B = 86.99 - 83	D+ = 69.99 - 67	

Policy on missed exams and coursework: Late work will incur a 10 percent penalty of the assignment points per day late, starting at the exact deadline. For example, a 5-point assignment submitted one minute after the deadline will incur a 10 percent penalty and the maximum score possible would be 4.5 out of 5, or an assignment submitted eight days after the deadline would incur an 80 percent penalty and the maximum score possible would be 1 out of 5. If you believe you are due an exception to these policies, please contact me **before** the work is due.

The tentative schedule below will give you an idea of what is covered in each class session, but it is your responsibility to determine what material was covered in any class sessions that you may miss.

Course policies:

COVID-19 accommodations: **First and foremost, do not come to class if you are sick!** This is a non-negotiable policy. Since all course content is or will be posted on Brightspace, you may complete the missed work from home. **When you are in class, you must wear a mask at all times.** For this reason, eating and drinking in class are not allowed.

Attendance policy: Attendance to the course is highly encouraged; you will certainly perform better on the assignments for the course if you attend class. I also hope you'll enjoy class sessions. **However, if you are sick and/or quarantined, you are expected to miss class.**

A note on personal responsibility and etiquette: Your enrollment in this course is only possible because a group of individuals saw something of value in you and accepted you to this top-tier university. Please, honor that decision and live up to your potential. Be responsible for yourself, be kind and respectful to your classmates and to me, and take your work for this course seriously.

Changes to the syllabus: As necessary, this syllabus or the schedule provided below may change throughout the semester. You will be notified of relevant changes, as appropriate.

Additional policies: In addition to the course-specific policies in this syllabus, the following University-wide policies and statements are pertinent to our course:

- Academic Guidance in the Event that You are Quarantined/Isolated
- Attendance Policy during COVID-19
- Classroom Guidance Regarding Protect Purdue

- [Academic Integrity](#)
- [Nondiscrimination](#)
- [Accessibility](#)
- [Mental Health](#)
- [Emergency Preparation](#)

Tentative Schedule:

Data basics and data reduction		
Date:	*In class topics:*	*Reading and major deadlines:*
Week 1: Jan. 10-14	Everything you need to know about statistics! (Just kidding.)	Syllabus
Week 2: Jan. 17-21 *No class: Jan. 16*	Univariate stats review Intro to SPSS	Field 1-4
Week 3: Jan. 24-28	Evaluating data quality	Field 5-6
Week 4: Jan. 31-Feb. 4	Data reduction Factor analysis	Field 18
Week 5: Feb. 7-11	Exam 1	
Comparing means		
Date:	*In class topics:*	*Reading and deadlines:*
Week 6: Feb. 14-18	Inferential statistics Chi-square *t*-tests	Field 10, 19
Week 7: Feb. 21-25	One-way ANOVA ANCOVA	Field 12-13 **Initial proposal due**
Week 8: Feb. 28-March 4	Interactions Multi-way ANOVA	Field 11, 14
Week 9: March 7-11 *No class: March 14-18*	Repeated measures MANOVA	Field 15-17
Week 10: March 21-25	Exam 2	
Regression		
Date:	*In class topics:*	*Reading and deadlines:*
Week 11: March 28-April 1	Correlation Basic regression	Field 8-9
Week 12: April 4-8	Advanced regression	Field 20-21
Week 13: April 11-15	Mediation	Field 11
Week 14: April 18-22	Exam 3	
Week 15: April 25-29	Work on final project	
Exam week: May 2-6	Final project due **Tuesday, May 3** (5 p.m. ET)	