

Course Syllabus: Psychology 5113
Psychological Statistics
Spring, 2020

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REQUIRED TEXTS

Diekhoff, G. M. (1992 reprint). *Statistics for the Social and Behavioral Sciences: Univariate, Bivariate, and Multivariate*. New York: McGraw-Hill (formerly Wm. C. Brown Publishers). Purchase from Psychology Department office. This text was written specifically for this course. It provides a review of elementary statistics and an introduction to advanced multivariate techniques but, by intention, does not delve into details such as statistical assumptions.

Meyers, L. S., Gamst, G., and Guarino, A. J. (2017 or 2013). *Applied multivariate research: Design and interpretation*. Los Angeles: Sage. (The 2017 edition mostly adds content on statistical procedures, including the analysis of missing data, confirmatory factor analysis, and structural equation modeling, that MSU's limited SPSS license does not support.) This text provides the depth and detail that was intentionally deleted from the Diekhoff (1992) text. You will find the coverage of SPSS mechanics particularly useful.

RECOMMENDED FOR A MORE COMPLETE STATISTICS LIBRARY

Warner, R. (2008 or 2013). *Applied Statistics: From Bivariate Through Multivariate Techniques* (2nd ed.). Los Angeles: Sage.

Tabachnick, B. G. & Fidell, L. S. (2013). *Using multivariate statistics* (6th ed.). Upper Saddle River, NJ: Pearson.

PURPOSES AND GOALS OF THE COURSE

We will spend the first half of the semester reviewing the basic concepts of univariate and bivariate statistics, filling in some of the details that were probably missing from your undergraduate statistics class. During the second half of the semester we will cover topics in bivariate and multivariate statistics that were certainly not covered in

your undergraduate course. In addition to acquiring a conceptual understanding of these statistical procedures, you will develop the ability to evaluate research scenarios in order to isolate the research questions being asked and determine which statistical techniques are most appropriate to answering those questions. You will become skilled in the use of statistics through regular homework and in-class assignments that require both manual calculation and computerized data analysis. Your training will include a thorough introduction to the use of IBM SPSS 26.0 for Windows and most class sessions will include at least some time spent in the computer lab working with IBM SPSS. The ultimate goal of this course is to train you to be intelligent and critical consumers of the technical and professional research literature in the social and behavioral sciences and to be capable users of applied statistics.

The course is fast-paced, and must be in order to cover the breadth of statistics. This will require concerted effort on your part. Although most reading assignments are relatively brief, chapters in your text are information-rich and extracting that information will require that you study it, work with it, and *experiment* with it. Don't be frustrated by the fact that you will be unable to grasp everything.

EXPECTATIONS

Please attend class regularly.

Please get to class early, not late.

Complete homework assignments in a timely manner

Be patient with those who learn more slowly than you do.

Be patient with those who learn more quickly than you.

Be courteous.

GRADING

Course grades will be determined primarily by your average on the four exams. These exams will cover definitional and conceptual knowledge as well as your ability to analyze research problems, select appropriate statistical procedures, and use statistics effectively to answer research questions. Borderline grades will be affected by factors such as attendance, timely completion of homework assignments, and quality (not quantity) of participation.

The grading scale will be as follows:

- 85-100% A
- 70-84.99% B
- 55-69.99% C
- 40-54.99% D
- Lower than 40% F

DISABILITIES

Individuals requiring special accommodations according to the Americans with Disabilities Act should work with the MSU Disabilities Office and request that they notify me directly.

TOPICS AND ASSIGNED READINGS

Introduction, Scales of measurement

- Diekhoff Chapter 1
- Meyers et al. Chapters 1, 2, 3

Descriptive Procedures

- Data Distributions and Graphs
 - Diekhoff Chapter 2
- Descriptive Statistics
 - Diekhoff Chapter 3
- Standard Scores, Standard Normal Distribution
 - Diekhoff Chapter 4
- Interval Estimation
 - Diekhoff Chapter 5

EXAM 1

Univariate Significant Difference Tests

- One-Sample Tests
 - Diekhoff Chapter 6
- Two-Sample Tests
 - Diekhoff Chapter 7
- One-Way ANOVA
 - Diekhoff Chapter 8
 - Meyers et al. Chapter 4
- Factorial ANOVA
 - Diekhoff Chapter 9

EXAM 2

Bivariate Correlation and Regression

Bivariate Correlation

Diekhoff Chapter 10

Meyers et al. Chapter 6

Bivariate Regression

Diekhoff Chapter 11

Multivariate Correlation and Regression

Partial and Semi-Partial Correlation

Diekhoff Chapter 12

Multiple Correlation and Regression

Diekhoff Chapter 13

Meyers et al. Chapters 7 and 8

Canonical Correlation

Meyers et al. Chapter 13

EXAM 3

Multivariate Significant Difference Tests

Discriminant Analysis (One-Way MANOVA)

Diekhoff Chapter 14

Meyers et al. Chapter 11

Factorial MANOVA

Diekhoff Chapter 15

Meyers et al.; Chapter 5

Examining Data Structures

Factor Analysis

Diekhoff Chapter 16

Meyers et al. Chapter 12

Cluster Analysis

Diekhoff Chapter 17

Meyers et al. Chapter 15

Multidimensional Scaling

Diekhoff Chapter 18

Meyers et al. Chapter 14

EXAM 4