

NB257: Statistics and experimental design

Winter 2018

Lecture times: TuTh 1:00-2:20PM in MH1201.

Instructor: Norbert Fortin, PhD norbert.fortin@uci.edu 949-824-9740

Office hours: 4:00pm-5:00pm Monday in 106 Bonney Research Lab (email first to confirm)

Web site: The class web site <https://canvas.eee.uci.edu/courses/8638> will include up-to-date information on the lecture schedule, readings and assignments.

Objectives: The objective is to provide students with a basic understanding of the statistical analyses most commonly used in neurobiology research. The focus will be on developing conceptual understanding of these statistical tests, so students can better determine when specific tests are appropriate or inappropriate. By the end of the course, students should have the tools they need to start analyzing their own data, and a strong foundation on which to continue to build their statistical knowledge.

Book: The following textbook is required. Affordable used versions are available online.

R.P. Runyon et al., (2000) Fundamentals of Behavioral Statistics, 9th Edition. McGraw Hill. ISBN: 9780072286410.

In-class assignments: There will be 7 in-class assignments, which will require students to perform the statistical tests covered in class. Students will be allowed to complete assignments at home, if needed. Note that students will need to bring a laptop to perform their statistics on assignment days (typically on Thursdays, see course schedule).

Statistical software: The use of Prism is highly recommended (30-day trial period offered at <http://www.graphpad.com/scientific-software/prism/>). It is very powerful, user-friendly, and includes an extensive and well-organized online library of tips and guides (accessed via the “help” menu). Students can use another statistics program provided they are already very comfortable with it.

Evaluation: In addition to the assignments, there will also be an “open book” midterm and final exam, consisting of short answers, short essays and simple datasets to analyze. Practice questions will be provided.

	Percent of Final Grade
Assignments (7):	35%
Midterm exam:	25%
Final Exam:	40%

CLASS SCHEDULE

Week 1: Getting started

- Tue 01/09 Lecture 1: Class overview
Thu 01/11 Lecture 2: Review + Getting to know your stats program
[Chapters 1,2,3,7](#)

Week 2: Descriptive statistics

- Tue 01/16 Lecture 3: Descriptive statistics
[Chapters 4,5,6](#) [Supporting articles on website](#)
Thu 01/18 Lecture 4: In-class assignment #1

Week 3: Correlation, regression and prediction

- Tue 01/23 Lecture 5: Correlation, regression and prediction
[Chapters 8,9](#) [Supporting articles on website](#)
Thu 01/25 Lecture 6: In-class assignment #2

Week 4: Probability and sampling distributions

- Tue 01/30 Lecture 7: Probability and sampling distributions
[Chapters 10,11](#) [Supporting articles on website](#)
Thu 02/01 Lecture 8: In-class assignment #3
[Supporting articles on website](#)

Week 5: Hypothesis testing and t-tests

- Tue 02/06 Lecture 9: Hypothesis testing and t-tests
[Chapters 12,13](#) [Supporting articles on website](#)
Thu 02/08 Lecture 10: In-class assignment #4

Week 6: Midterm exam

- Tue 02/13 Lecture 11: Review session
Thu 02/15 Lecture 12: MIDTERM EXAM

Week 7: One-Way ANOVAs, General linear model (GLM)

- Tue 02/20 Lecture 13: One-way ANOVAs and GLM
[Chapter 14](#) [Supporting articles on website](#)
Thu 02/22 Lecture 14: In-class assignment #5

Week 8: Two-Way ANOVAs, factorial and repeated-measures

- Tue 02/27 Lecture 15: Two-way ANOVAs (factorial and repeated-measures)
[Chapters 15,16](#) [Supporting articles on website](#)
Thu 03/01 Lecture 16: In-class assignment #6

Week 9: Non-parametric tests, resampling techniques

- Tue 03/06 Lecture 17: Non-parametric tests, resampling techniques
[Chapter 18](#) [Supporting articles on website](#)
Thu 03/08 Lecture 18: In-class assignment #7

Week 10: Last but not least

- Tue 03/13 Lecture 19: Power failures (replicability issues), power analysis
[Supporting articles on website](#)
Thu 03/15 Lecture 20: Categorical data (e.g., Chi-square)
[Chapter 17](#) [Supporting articles on website](#)

Finals week: FINAL EXAM

- 03/17-03/23 **Location TBD**