NB257: Statistics and experimental design

Winter 2020

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

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

Office hours: 5:00pm-6:00pm Monday in 106 Bonney Research Lab (email first to confirm)

Web site: The class website https://canvas.eee.uci.edu/courses/23456 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

Lect01: Class overview

       Chapters 1,2,3,7

Lect02: Descriptive Statistics + Assignment #1

       Chapters 4,5,6   Supporting articles on website

Lect03: Correlation, regression and prediction

       Chapters 8,9   Supporting articles on website

Lect04: In-class assignment #2

       Supporting articles on website

Lect05: Probability and sampling distributions

       Chapters 10,11   Supporting articles on website

Lect06: In-class assignment #3

       Supporting articles on website

Lect07: Hypothesis testing and t-tests

       Chapters 12,13   Supporting articles on website

Lect08: In-class assignment #4

       Supporting articles on website

Lect09: Review session

Lect10: MIDTERM EXAM

Lect11: One-way ANOVAs (factorial and repeated-measures)

       Chapter 14   Supporting articles on website

Lect12: In-class assignment #5

       Supporting articles on website

Lect13: Two-way ANOVAs (factorial and repeated-measures)

       Chapters 15,16   Supporting articles on website

Lect14: In-class assignment #6

       Supporting articles on website

Lect15: Review of midterm and ANOVA assignments (#5 and #6)

Lect16: Non-parametric tests, resampling techniques

       Chapters 18   Supporting articles on website

Lect17: Assignment #7

       Supporting articles on website

Lect18: Categorical data (e.g., Chi-squares)

       Chapter 17   Supporting articles on website

Lect19: Power failures (replicability issues), power analysis

       Supporting articles on website

Lect20: Power analyses and other aspects of experimental design

       Supporting articles on website

FINAL EXAM