

Short Course on Statistical Power Analysis
Washington University School of Medicine
M88-547
SYLLABUS

Instructor: Rob Culverhouse, Ph.D. (rculverh@wustl.edu) 314-454-8712 (office)
Department of Medicine and Division of Biostatistics, Washington University School of Medicine

Meeting place:

Meeting dates and times:

Course Overview:

This short one-hour credit course will provide an overview of the concepts of statistical power, statistical precision, sample size and effect size. The primary goal of this course will be to prepare you for productive and efficient statistical consultations regarding issues of statistical power and sample size. We will cover statistical power computations for a variety of experimental and epidemiological study designs (for example: single sample designs, two-sample designs, case-control designs and various other experimental designs based on the Analysis of Variance model). Other issues relating to the balance of scientific interests and statistical design and analysis as related to power will also be presented. Various ways that researchers can present power/precision arguments in their grant applications including viewing statistical power as a function of sample and effect sizes will be covered. Statistical power computations will be illustrated via free software.

Participants will be expected to perform various power computation exercises throughout the class; as a practical extension, participants will also be encouraged to bring a power calculation problem they are currently considering in their research to work on as an example in the class.

Course Objectives: After this course participants will be able to:

1. Understand the underlying principles of statistical power
2. Understand the fundamental components of power calculations for basic study designs
3. Understand how power calculations can inform design and research refinement;
4. Understand the types of power analyses: the pros, cons and pitfalls of common approaches
5. Be able to perform simple power calculations manually and with the assistance software
6. Be prepared to have an efficient and productive consultation with a statistician for planning your study
7. Be able to present basic power information in grant applications and use power and sample size calculations as the basis of argument in support of study design, feasibility and testing.

Course Materials:

Papers: Several medical and statistical research articles will be discussed throughout the class.

Free Software:

Russ Lenth's Power and Sample Size webpage: <http://www.stat.uiowa.edu/~rlenth/Power/>

PS.exe (free download from: <http://biostat.mc.vanderbilt.edu/twiki/bin/view/Main/PowerSampleSize>)

(free software required for class) G*Power **version 3.1.9.2** will be used in the class.

Available from <http://www.psych.uni-duesseldorf.de/abteilungen/aap/gpower3/>

Reference Text: (not required)

Power Analysis for Experimental Research by R. Barker Bausell and Yu-Fang Li [© Cambridge Press, 2002]

Evaluation: Participants will be encouraged to practice power calculations throughout the short course.

40% Class participation

30% Homework 1 (assigned Saturday October 27, due November 3)

30% Final HW/Computer Lab (assigned Saturday November 3, due November 10)

Grades will be determined on a standard 10-point scale (i.e. 90-100 =A; 80-89.9 =B; etc.).