INTEGRATIVE PHYSIOLOGY 5800
ADVANCED STATISTICS AND RESEARCH METHODS IN INTEGRATIVE PHYSIOLOGY
Fall 2011

Instructor:	Matt McQueen, ScD	
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Office Hours:	TBA	
Teaching Assistant:	Megan Burton (megan.burton@colorado.edu)	
Lectures:	Monday:	4.00pm – 5.25pm
	Wednesday:	4.00pm – 5.25pm
Computer Lab:	Thursday:	4.00pm – 5.25pm
Location:	Lecture:	CLRE 302
	Lab:	CLRE 210
Text Book:	*Fundamentals of Biostatistics, 7th Edition*	
	Bernard Rosner; Duxbury Thomson Learning	
Website:	Course Materials:	Desire2Learn (http://learn.colorado.edu)
	Course Blog:	http://orangeline.colorado.edu/blog
	Twitter:	@biostatbuff
	Facebook:	IPHY 5800 Page

Course Description: The focus of this course is to introduce advanced statistical techniques important for analyzing data arising in biomedical research, including physiology. Statistical reasoning will be emphasized through problem solving and applications.

Prerequisites: IPHY 2800 (Introductory Statistics) or equivalent.

Course Requirements: There will be ***two in-class examinations***, ***twelve problem sets*** and ***one final project***. The two exams will each be worth 20% of the final course grade (100 points each). The exams will not be cumulative, however you will be expected to understand how previously covered material relates to the material being tested. The twelve problem sets will collectively be worth 30%. The problem sets will be available online Monday (before the end of the day) and due the following Monday (at the beginning of lecture). Late problem sets will not be accepted unless previously arranged with the instructor. The final project will be worth 20% of the final course grade. Ideally, the final project will be conducted using data generated by the laboratory/mentor that you are working with. If no data are available for any reason, then a dataset will be provided. Details regarding the final projects will be announced throughout the semester. The remaining 10% of the final course grade will be based on participation - this includes attending lab and interaction throughout the course.

Lectures: Every Monday and Wednesday will be dedicated to lecture material. Photocopies of the lectures will be handed out weekly (typically on Monday). Electronic copies be available on the course materials website. Any examples done by hand during lecture will not be available in electronic form.

Laboratory Sessions: ***Twelve lab sessions*** led by the instructor and the teaching assistant will meet throughout the semester on Thursday (4.00-5.25). These sessions will be used to introduce the computational aspects of data analysis through hands-on application to the problem sets. Graded problem sets will be returned during the lab session and general computing issues will be discussed.

Computing: This course will provide an introduction to the ***R*** statistical package. Handouts explaining the basic procedures for using ***R*** will be provided. However, you are free to use any statistical package you wish. *Note: You will need to consult with your research advisor as to which package to use throughout the course if you do not use*

R.

IPHY 5800 - Fall 2011 (McQueen) - Tentative Schedule and Reading List

Date	Topic	Chapter	Lab	PS
08/22-08/25	Introduction / Descriptive Statistics	1, 2	1	1
08/29-09/01	Probability / Diagnostic Testing	3	2	2
09/07-09/08*	Probability Distributions 4, 5	(3)	3	
09/14-09/15**	Estimation	6	(4)	4
09/19-09/22	Study Design / Hypothesis Testing	13.2, 7.1-7.4, 7.7	-	-
09/26-09/29	Testing Means I & II	8.1-8.8, 12.1-12.4	5	5
10/03-10/06	Testing Proportions / Measures of Effect	10, 13.3-13.4	6	6
10/10-10/13	Nonparametric Methods / Statistical Power	9, 7.5, 10.5	7	7
10/17-10/20	**Exam I (100 points)**	-	-	-
10/24-10/27	Regression and Correlation	11.1-11.8	8	8
10/31-11/03	Multiple Regression	11.9, 12.5-12.6	9	9
11/07-11/10	Logistic Regression	13.8	10	10
11/14-11/17	Survival Analysis	14.8-14.11	11	11
11/21-11/24	*FALL BREAK*	-	-	-
11/28-12/01	Longitudinal and Cluster Correlated Data	12.8, 13.13-13.14	12	12
12/05-12/08	**Exam II (100 points)**	-	-	-
12/12* **	**Final Projects (100 points)**	-	-	-

*There will be no class on Monday September 5, 2011 in observance of *LABOR DAY*.
**There will be no class on Monday, September 12, 2011 due a schedule conflict.
***Final projects will be presented during the final exam slot (Monday, December 12 from 7.30am - 10.00am).

The Fine Print

Disability Services
If you qualify for accommodations because of a disability, please submit to me a letter from Disability Services in a timely manner so that your needs be addressed. Disability Services determines accommodations based on documented disabilities. Contact: 303-492-8671, Willard 322, and http://www.Colorado.EDU/disabilityservices

Religious Observances
Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. In this class, you will have the opportunity to complete the scheduled exam or assignment on an alternate date. See full details at http://www.colorado.edu/policies/fac_relig.html

Classroom Behavior
Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, culture, religion, politics, sexual orientation, gender, gender variance, and nationalities. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. See policies at http://www.colorado.edu/policies/classbehavior.html and at http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student_code

Discrimination and Harassment
The University of Colorado at Boulder policy on Discrimination and Harassment, the University of Colorado policy on Sexual Harassment and the University of Colorado policy on Amorous Relationships apply to all students, staff and faculty. Any student, staff or faculty member who believes s/he has been the subject of discrimination or harassment based upon race, color, national origin, sex, age, disability, religion, sexual orientation, or veteran status should contact the Office of Discrimination and Harassment (ODH) at 303-492-2127 or the Office of Judicial Affairs at 303-492-5550. Information about the ODH, the above referenced policies and the campus resources available to assist individuals regarding discrimination or harassment can be obtained at http://www.colorado.edu/odh

Honor Code
All students of the University of Colorado at Boulder are responsible for knowing and adhering to the academic integrity policy of this institution. Violations of this policy may include: cheating, plagiarism, aid of academic dishonesty, fabrication, lying, bribery, and threatening behavior. All incidents of academic misconduct shall be reported to the Honor Code Council (honor@colorado.edu; 303-725-2273). Students who are found to be in violation of the academic integrity policy will be subject to both academic sanctions from the faculty member and non-academic sanctions (including but not limited to university probation, suspension, or expulsion). Other information on the Honor Code can be found at http://www.colorado.edu/policies/honor.html and at http://www.colorado.edu/academics/honorcode/

Advanced Statistics and Research Methods in Integrative Physiology. Spring 2011. g. Compute probabilities for a Binomial distribution. h. Identify the key properties of the Poisson distribution. i. Compute probabilities for a Poisson distribution. j. Explain the difference between the Normal, Binomial and Poisson distributions.Â 8. Apply inferential methods relating to the means of Normal distributions (1 lecture, 1 lab). a. Identify the difference between the t distribution and the Normal distribution. b. Construct one- and two-sided hypothesis tests and confidence intervals for the mean of a Normal distribution where the underlying variance is either known or unknown. c. Construct one- and two-sided hypothesis tests and. Molecular & Integrative Physiology of Comparative Biochemistry and Physiology deals with molecular, cellular, integrative, and ecological physiology. Topics include bioenergetics, circulation, development, excretion, ion regulation, endocrinology, neurobiology, nutrition, respiration, and thermal biology.Â SJR is a measure of scientific influence of journals that accounts for both the number of citations received by a journal and the importance or prestige of the journals where such citations come from It measures the scientific influence of the average article in a journal, it expresses how central to the global scientific discussion an average article of the journal is.