

Biology 4080, Advanced Biostatistics — Course Information, Spring 2017

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Office Hours: Tuesdays 1:00–2:00 PM in ASCB 323D or by appointment

Texts: Zar, J.H. 2010. *Biostatistical Analysis, 5th ed*, Pearson. (ISBN 0321656865)

Prerequisites: BIOL 3000 or equivalent

Objectives:

- Describe theory underlying advanced statistical methods
- State statistical models and their assumptions for advanced statistical methods
- Choose appropriate statistical analysis for different experimental designs
- Perform a variety of statistical analyses using computer software
- Correctly interpret the results of advanced statistical procedures

Assessment: Exams, homework problems, and lab assignments will be used to evaluate your understanding of statistical concepts and your ability to apply statistical analyses to experimental data.

Attendance: You are expected attend all lectures and labs. A written medical excuse is required to miss an exam. All lab assignments must be completed before the start of the next week’s lab.

Disabilities: Reasonable accommodation will be provided to any student registered with the Office of Students with Disabilities and who requests needed accommodation.

Honesty: Students should abide by the University’s Academic Honesty Policy, which can be found on the *Moodle* site for this course. Students who violate this policy will be subject to disciplinary action, and may receive a failing grade in the course for a single violation.

Miscellaneous: A scientific calculator is required. A calculator is needed for exams. You should also use a USB drive for saving your lab assignments. You are responsible for backing up your work.

Lecture Schedule

Dates	Topic	Reading
Jan 24, 26, 31	Descriptive statistics	§ 3.1–3.5, 4.1–4.7, 6.5
Feb 2, 7, 9	Hypothesis testing	§ 6.3, 7.7
Feb 14, 16, 21	One Factor ANOVA	§ 10.1, 10.6, 11.1
Feb 23, 28, Mar 1	Two Factor ANOVA	§ 12.1, 12.4
Mar 7, 9, 14	Multifactor & nested experiments	§ 14.1, 15.1, 15.2
Mar 16	Midterm (100 points)	
Mar 21, 23, Apr 4	Regression analysis	§ 17.1–17.3, 20.1–20.3, 20.14, 21.1
Apr 6, 11, 13	Multivariate general linear models	§ 16.1–16.4
Apr 18, 20	Logistic Regression	See lab handout.
Apr 25, 27, May 2	Contingency tables; log-linear models	§ 23.1, 23.3, 23.7, 23.8, 24.16
May 4, 9, 11	Nonparametric statistics	§ 8.10, 8.11, 9.5, 10.4

Final Exam: Thursday, May 18, 9:10–11:10 AM. The final exam is comprehensive.

<i>Grading:</i>	Midterm	100 points
	Four homework assignments (20 points each)	80 points
	Twelve lab assignments (10 points each, drop lowest)	110 points
	Two Web QnA assignments (5 points each)	10 points
	Final exam	200 points
	TOTAL	500 points

Grading is based on the +/- system. Your letter grade will be computed from your total number of points as follows:

A	467–500 points	A–	450–466 points	B+	434–449 points
B	417–433 points	B–	400–416 points	C+	384–399 points
C	367–383 points	C–	350–366 points	D+	334–349 points
D	317–333 points	D–	300–316 points	F	0–299 points

Be aware that a *C–* contributes a 1.7 to your GPA. The lower bounds for these letter grades may be adjusted downward if “scaling” is warranted; however, the entire class will subject to the same letter grade bounds.

Exam Format: Closed book. Computation and short answer questions. You will be permitted to prepare and use one sheet of formulae or notes during the exam.

Homework: There will be four homework assignments. They must be done individually. In some cases you will be required to use the computer to complete your assignment. **Late homework assignments receive no credit.** Each homework assignment is worth 20 points. Due dates will be given in lecture.

Web QnA: This is an on-line question/answer/comment system. Each student will receive a different question. Answers must be entered by the deadline. The instructor will comment on each answer. All students can read the questions, answers, and comments. Due dates will be given in lecture and posted on *Moodle* when the questions are assigned.

Laboratory: The laboratories will be held in a computer classroom. Each laboratory will have a computer-based assignment. All assignments must be completed and submitted to the instructor through *Moodle* before the beginning of the next week’s lab. Each lab assignment is worth 10 points. **Late lab assignments receive no credit.**

Laboratory Schedule

Dates	Topic	Dates	Topic
Jan 26	No lab this week	Mar 23	Discriminant analysis
Feb 2	Introduction to <i>SPSS</i>	Mar 30	Spring break
Feb 9	Data manipulation in <i>SPSS</i>	Apr 6	Regression analysis
Feb 16	Fishing for <i>P</i> -values	Apr 13	General linear models
Feb 23	Introduction to <i>R</i>	Apr 20	Logistic regression
Mar 2	Principal component analysis	Apr 27	Log-linear models
Mar 9	Factorial ANOVA	May 4	Nonparametric statistics
Mar 16	No lab this week	May 11	No lab this week