

California State Polytechnic University
Biological Sciences Department

BIO 499 - Advanced Biometrics Course Syllabus Winter 2007

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Course Objectives and Goals

Students will learn the basics of multivariate statistical analysis, particularly multiple regression and principal components analysis. Students will learn to use the SAS statistical package for analysis of research data.

Required Texts and Materials

McGarigal, Kevin, Sam Cushman, and Susan Stafford. 2000. *Multivariate Statistics for Wildlife and Ecology Research*. Springer-Verlag, New York. 283 pages. ISBN 0-387-98642-1.

Available at the bookstore or from www.amazon.com (\$38.65 on December 12, 2006).

All students are required to have the Advanced Biometrics Pac (AdPac). This document contains all of the classroom examples and handouts, as well as supplementary material, such as instructions on how to use the SAS program. In addition, all of the SAS assignments are in the AdPac. The AdPac is not available at the bookstore. It may be downloaded for free from the web (go to Dr. M's web page: www.csupomona.edu/~djmoriarty/ and click the link for Advanced Biometrics), or a master copy will be provided for students to copy.

All students are required to arrange access to the SAS computer program (see below).

Prerequisites

BIO 211/L - Biometrics

Exam and Assignment Schedule

Midterm exam: to be announced

Final exam: Thursday, March 15, 2007; 11:30 am - 1:30 pm.

Five assignments using SAS will be given, exact due dates will be announced in class with at least one week lead time.

One special assignment: "Week 8" assignment involving SAS and independent work. Due: February 27, 2007.

Make-up Exam and Assignment Policy

Exams must be taken at the scheduled time. No early or make-up exams will be given. No make-ups for the SAS assignments are allowed.

Grading System and Examination Method

The midterm and final exam are 100 points each. Five SAS assignments at 10 points each is 50 points. Special Week 8 assignment is 25 points. Total of exams, SAS assignments, and Special Week 8 assignment is 275 points. Grading will be on a class curve. Exams will be short answer. The final exam is not comprehensive.

Academic Integrity

Cheating and plagiarism are violations of university policy and are considered serious offenses. The Biological Sciences Department takes all incidences of academic dishonesty seriously and acts accordingly.

Accessing the SAS program

The California State University holds a site license to the SAS system which allows students and faculty to install it on their home computer for university business. To get SAS, take blank, recordable CDs (for computers) to the Help Desk (Building 1, Room 100). Do this as soon as possible, as it will probably take a while to get your copy.

SAS on Windows

Dr. M. has never installed or dealt with SAS on a Mac. If you get SAS for the Mac, you'll get version 6.12, which will be fine for the course. However, you're on your own for installing and running SAS.

For Windows, you'll get SAS 9.1 (requires 10 CDs). Note: One of the CDs is not actually used during the installation. However, the HelpDesk and will give you all 10 CDs.

Installing SAS should be done by someone comfortable with installing complex software. Here are a few tips for Windows users:

- Start with the first step, where SAS checks the Windows runtime components. SAS will want to update these components. This has never caused a problem on any of the computers where Dr. M. has installed SAS.
- Take the default, complete installation, unless you really know SAS well. While it is true that the part of SAS you need is small, it is scattered throughout various components, some of them unexpected.
- SAS will require an enormous amount of disk space. SAS 9.1 for Windows will take up (all values approximate) 1.85 GB, including 8,442 files in 330 folders.
- You may encounter problems with the license. If the license on the CDs is current, SAS should find it and install without any intervention. However, the license that is on the CD may be expired. If you don't get the current license on your CDs (it would be on the first CD, i.e. the "Setup" CD), you can get the license renewal from Dr. M. – either by email or by bringing a USB flash drive to his office. Either way, you'll get a file called sas91_170340.txt which has the license renewal. **DO NOT OPEN THIS FILE.** If you do open it, **DO NOT SAVE IT.** SAS is very fussy if it thinks the file may have been altered. If the license on the CD has expired, SAS will want to know where the license renewal is located on the computer. You will be able to "browse" to the license file using standard Windows methods. Once SAS finds the sas91_170340.txt file, things should go fairly smoothly. Leave the sas91_170340.txt file alone until SAS is completely done installing. It accesses the file right after it finds it, and once again at the end of the installation process. After SAS has installed properly, you won't need the sas91_170340.txt file again. You may then open it (just use any text editor – it's in plain, ASCII text) and look at it – but it's not very exciting!

Dr. M. will try to answer your questions, but it may be difficult to help you without seeing exactly what is happening on your computer. If you have a laptop, by all means bring it with you.

If you are a Bio TA and have a computer in your office, Dr. M. will help you install SAS on that computer if you encounter problems. It will be necessary to get administrative access to the computer - contact Kevin Franke

Successful access to the program is ultimately the responsibility of the student. SAS is not available on computers in open access labs (such as in the CLA or by the Career Center). If can't get access to SAS, you may have to drop the class.

IMPORTANT: Obtain SAS and start working on the installation immediately. Don't wait until near the time when the first assignment is due. The probability of encountering problems on installing SAS is high, and you must allow time to solve those problems. You must submit your assignments on time. Having problems with SAS installation/execution will not be allowed as an excuse for missing assignment deadlines.

Tentative Lecture Schedule / Reading Assignments / Extra Credit Opportunity

Topic	Reading Assignment Chapters are from the required textbook (McGarigal). Be sure to read all material in the AdPac about each topic.	Extra Credit
Introduction to SAS		
Begin material for Exam 1		
Matrix Algebra Review		[review questions in AdPac]
Dispersion Matrices	Chapt. 1	
Multiple Regression	Topics are not covered in the text. Review regression & correlation from BIO 211, and if possible, Read Zar Chapters 20 & 21.	
Ridge Trace		
Polynomial Regression		
Logistic Regression		
EXAM 1		
Eigenvalues/Eigenvectors		
Principal Components Analysis (PCA)	Chapt. 2	
Discriminant Analysis	Chapt. 4	
Canonical Correlations Analysis	Chapt. 5	
Correspondence Analysis		
Cluster Analysis	Chapt. 3	
Summary/Comparisons (no lecture; from reading)	Chapt. 6	
EXAM 2 (Final Exam)		

Extra Credit (Optional)

Twice during the quarter, each student will be assigned a lecture topic. The student may write an exam question for each topic, and email their question and their answer to Dr. Moriarty (djmoriarty@csupomona.edu). Dr. Moriarty will post the questions, answers, and commentary on the course web page, so that all students may use them for review. If the question and answer are received by the due date (see below), and are judged sufficiently rigorous and thoughtful (at the discretion of the instructor), extra credit of 5 points will be awarded. Since there will be two question/answers to be submitted, a maximum of 10 extra credit points may be earned. Dr. Moriarty reserves the right to modify this policy without prior notice.

Send your questions to Dr. M. via email. Put **BIO 499** in the subject of your email. You may attach your question as a Word document, or include it in the body of the email message. Please try to avoid excessive formatting if you prepare your questions in Word. It can be difficult to transfer formatting done on Word to the web page. **Don't forget to include your answer!**

Questions due to Dr. M. (email) 48 hrs after your topic has been completed in lecture.