BIOLOGY 570/670, 2003

Syllabus

Required chapters in your textbook are listed for each week. Readings on reserve in the library are optional. “T&F” = Tabachnik and Fidell (2001).

Week 1
Jan 6 Class structure, numerical literacy, get assignment for project. Data structures, matrix representations. Read: Ch. 1 and 2; Appendix 1; “Course Mechanics” in packet; Yoccoz 1991.
Jan 8 Overview of community matrices; single species on environmental gradients.
Jan 10 Finish overview; begin cluster analysis. Read Ch. 10.

Week 2
Jan 13 Cluster analysis, MRPP, distance measures in brief. Read: lab activity in packet, Ch. 6, p. 45, Ch. 10 (all), and Ch. 24, pp. 188-192. (If the subject is new to you, this is a lot to digest all at once. Stay calm. We will return to these topics. The problem is that for us to do something interesting in lab, you need to have the basic idea about distance measures as well as understand a bit of the analytical techniques. For now try to appreciate the essence of what we are doing, foregoing some of the details.)
Jan 13 Lab: Cluster analysis and testing for group differences
Jan 15 Distance measures (Ch. 6). See also on reserve: Beals 1984, p. 21-29 on distance measures.
Jan 17 PROJECT PROPOSAL DUE; Distance measures, continued.

Week 3
Jan 20 MLK HOLIDAY
Jan 20 MLK LAB HOLIDAY
Jan 22 Cluster analysis (Ch. 10 & 11)
Jan 24 Introduction to ordination (Ch. 13). Read Beals 1984, p. 1-8, p. 9-11

Week 4
Jan 27 Principal Components Analysis (Ch. 14). See also: Beals 1984, p.18-21, 33-44; T&F, ch. 13.
Jan 27 Lab: Ordination of eating habits Also read: Documenting Flow of Analyses, Ch. 8
Jan 29 Principal Components Analysis, cont.; Non-metric multidimensional scaling (Ch. 16). See also: Beals 1984, p.17-18; Clarke (1993)
Jan 31 Non-metric multidimensional scaling, cont. (Ch. 16).

Week 5
Feb 3 Data screening (Ch. 7; See also: T&F, ch. 4.), data transformations (Ch. 9). (Note: Understanding data transformation is critical for successful community analysis. Data
transformation typically precedes data analysis, but pedagogically it is important for you to have used a few analytical methods, to provide a context for understanding data transformation.)

Feb 3  *Lab: Are conclusions based on NMS reliable?
Feb 5 MIDTERM EXAM
Feb 7 Data transformation, cont. (Ch. 9)

Week 6
Feb 10 Rotating ordinations (Ch. 15); Weighted averaging (Ch. 18).
Feb 10 *Lab: Data Transformations; report orally on results in lab
Feb 12 Correspondence Analysis (Ch. 19); Detrended Correspondence Analysis (Ch. 20); see also: Beals 1984, p. 13-17.
Feb 14 Twinspan (Ch. 12); Canonical Correspondence Analysis (Ch. 21)

Week 7
Feb 17 Finish CCA; sign up for afternoon slot to meet with McCune.
Feb 17 *Lab: work on and get help with your project.
Feb 19 Multivariate experiments (Ch. 23), Indicator species analysis (Ch. 25).
Feb 21 MRPP (Ch. 24); Discriminant analysis (Ch. 26). See also: T&F, Ch. 11.

Week 8
Feb 24 Mantel Test (Ch. 27)
Feb 24 *Lab: Detecting outliers and their consequences
Feb 26 FIRST DRAFT OF PROJECT REPORT DUE. Reliability of ordination results (Ch. 22);
Nested designs (Ch. 28).
Feb 28 Summary: choosing an ordination technique.

Week 9
Mar 3 Catch-up day. Return draft project reports.
Mar 3 *Lab: work on and get help with your project
Mar 5 Species diversity (Ch. 4).
Mar 7 Species diversity (Ch. 4).

Week 10
Mar 10 Habitat models (handout; no assigned reading). SUBMIT FINAL PDF ELECTRONICALLY before 5 pm to BruceMcCune@science.oregonstate.edu.
Mar 10 *Lab: student project presentations (10 minute talk + 5 minute discussion)
Mar 11 Tuesday at Noon: McCune posts all PDFs on Blackboard by noon. Get reviewing assignment by email if you don’t have it already.
Mar 12 Classification and regression trees (CART; Ch. 29)
Mar 14 Structural equation modeling (SEM; Ch. 30); PDF REVIEWS DUE 5 pm. Submit to BruceMcCune@science.oregonstate.edu

* Hand in your lab work at the end of these labs.

Final exam: Wednesday, March 19, 1200-1350