Multivariate Statistics

In this course I present basics of various types of multivariate statistics used commonly (and thus appearing commonly in the scientific literature). The course is retrospective, not comprehensive. There are numerous topics in multivariate statistics, far too many to cover in a single semester, but statistical literacy does not require complete knowledge of all techniques. Rather, knowing enough about basic groups of methods (e.g., classification vs. data reduction vs. ordination) is often sufficient to ask the right questions and begin an analysis properly. The course is structured around lectures, but I encourage and welcome student participation. Often the best strategy to gain a solid understanding of a “scary” topic like statistics is the be unafraid to ask questions, to seek additional clarification, and to share thoughts, ideas, and concerns. To that end, I stress understanding of principles over rote memorization of mathematics behind the principles (although some math is necessary, of course). One way we gain a deeper understanding of the techniques we go cover in lectures is to read and discuss papers that deal with that technique. As confidence grows in one’s ability to decipher the statistics, published papers can be approached more critically and constructively. Because emphasis is on “common” techniques, we spend a seemingly “inordinate” amount of time of certain statistics that are used widely. This will be especially true of principal components analysis (PCA), what might well be the most commonly used truly multivariate stat. MANOVA, multiple regression (technically a univariate stat—you will come to understand why), and discriminant function analysis (DFA) are also used widely, so we will spend extra time on each.