Excerpt from ASA's 2016 GAISE Report for colleges, pp.23-24
http://www.amstat.org/asa/education/Guidelines-for-Assessment-and-Instruction-in-Statistics-Education-Reports.aspx

Suggestions for Topics that Might be Omitted from Introductory Statistics Courses

While there is an impressive growth in the number of students taking more advanced courses in statistics, many of our students take only a single course in statistics. This has led to a tendency to cram as much material into the syllabus as possible. The natural question then is what to minimize or diminish. We offer these topics as candidates for reconsideration in the traditional course.

Our guide for these suggestions is to keep in mind *why* the course is required for so many of our students (and elected by so many others). We believe that students need to learn to think scientifically and to deal with statistics in their own disciplines. Students should be able to read research literature with a critical eye. They should be able to understand what was studied, what was concluded, and how as (eventual) professionals and citizens they should judge the conclusions in the context of their own discipline.

The goals set out in this document address concepts and methods that support the development of such a student. Here are some thoughts on topics that might be reconsidered:

- *Probability theory*. The original GAISE report recommended less emphasis on probability in the introductory course and we continue to endorse that recommendation. For many students, an introductory course may be the only statistics course that they take; therefore some instructors will want to teach basic probability and rules about

random variables, with perhaps the binomial as a special case. However, the GAISE goals and recommendations can be met without these topics.

- *Constructing plots by hand*. Data displays are now made by computers. Students need to know how to read and interpret them. Instead of spending lots of time creating histograms by hand, use some of that time instead to develop a deeper understanding and ask more challenging questions about what the plots tell us about the data.
- *Basic statistics*. Histograms, pie charts, scatterplots, means, and medians are now taught in middle and high school and are a prominent part of the Common Core State Standards in Mathematics. Classes taught to adults continuing their education or to students with a different high school background may need to spend a bit more time on basic statistics. No matter the audience, instructors will want to be sure that students truly understand these concepts, but should not dwell on them more than is necessary. Instructors may want to briefly review them to be sure terminology and notation are consistent, but this should take little time.
- *Drills with z-, t-, χ^2, and F-tables*. These skills are no longer necessary and do not reflect modern statistical practice. Apps that perform the lookup (and are not limited to a finite list of *df* values) are available in general purpose statistical software packages, web pages, smartphones, or (soon) watches. Since statistical software produces a *p*-value as part of performing a hypothesis test, a shift from finding *p*-values to interpreting *p*-values in context is appropriate (see also the ASA statement on *p*-values: Wasserstein, R. L., and Lazar, N. A., 2016). This shift makes it unnecessary to examine students on their ability to use these tables, so they can usually be dispensed with on exams.
- *Advanced training on a statistical software program*. SAS certification, non-introductory R programming, and other more extensive programming topics belong in subsequent courses. Modern students have grown up with computers and know how to search for support online. The basic computer package skills needed to undertake analyses for the introductory statistics course can often be taught throughout the course or developed using online training. Some instructors may train students in using a specific software package, but mastery of advanced programming skills should not be allowed to crowd out data analysis skills or statistical thinking.