

ST-351 PRINCIPLES OF STATISTICS II

- **Background** A sequel to ST-251 (Principles of Statistics), is proposed. A tentative proposal is to drop ST-401 (Statistical Analysis), which is usually made up of 85-90% graduate students, and replace it with ST-515 (Statistics Methods for Researchers), a class more clearly directed at graduate students.

However, ST-401 is a required course for undergraduates in Mathematics taking either the Actuarial Science option or the Statistics option. It is also a required course for undergraduates in Geography and Cartography. Additionally, it is a requirement for undergraduates seeking a minor in Statistics. A replacement for ST-401 appears necessary.

Another reason for a sequel is the perception by some members of the Statistics faculty that the current ST-251 syllabus is too ambitious, in containing too many topics for a 3-credit course. This perception was voiced by several faculty in an ad hoc group meeting to discuss ST-150 and 251.

The syllabus for ST-251 should be slightly changed. One-way ANOVA should be dropped in ST-251 and χ^2 tests should be made optional. ST-351 would include both topics. The balance between concepts and methods would differ between ST-251 and ST-351 as well. The ratio of concepts to methods would be 75:25 for ST-251 and 30:70 for ST-351.

A third reason for a sequel is to attempt to increase the number of undergraduate students taking statistics and those seeking a minor in Statistics. With the exception of ST-301, there is no other 300 level statistics course. Making the jump from ST-251 to ST-422 is perhaps perceived to be greater than it is, but the jump to ST-401 is in fact sizeable, especially once the student realizes that 85-90% of the class are graduate students. ST-351 would be perceived as a gentler next step.

- **Pre-requisites** ST-251, 271, or 301.
- **Format** 3 one-hour lectures and a one-hour recitation/lab.
- **Text** *Introduction to the Practice of Statistics*, 3rd Ed. by Moore and McCabe.
- **Topics**
 1. (1.5 weeks) Overview of ST-251 with re-emphasis on basic concepts
 2. (1.5 weeks) More probability, particularly conditioning
 3. (1 week) Chi-square, goodness of fit, tests of independence and homogeneity
 4. (2 weeks) One-way ANOVA, including contrasts, multiple comparisons
 5. (2 weeks) Two-way ANOVA, including Randomized Block Design
 6. (4 weeks) Multiple regression, including ANOVA and ANCOVA as special cases, diagnostics
 7. (1 week) Nonparametrics: sign test, rank-sum test, signed rank test, Kruskal-Wallis test
 8. (1 week) Logistic regression