PUMAS
Design Criteria for the Applied Statistics Graduate Curriculum

Overview

STAT 511 and 512 (Design and Data Analysis for researchers I and II) form a critical part of graduate student degree programs across campus. The courses were originally developed by Graybill Statistical Laboratory faculty to provide statistical training for graduate student researchers primarily in the biological, agricultural, and environmental sciences and have been successful in training non-statistics graduate students in applied statistics for decades.

However, in this era of big data, data science, and informatics, domain-scientists face new challenges in implementing modern-age statistical capabilities. Moreover, domain-scientists have become increasingly knowledgeable about data science and statistics, and this is reflected in the expectations put on students in terms of learning statistics and data science.

Outreach to campus

Sensitive to the changing role of statistics in science and engineering through our strong interdisciplinary research interactions, statistics faculty reached out to campus through personal visits, emails, and surveys to develop a better understanding of current and future statistical needs. Some of these discussions reached a level of detail that include course topics and prerequisites. We also considered the expanding requests of non-statistics graduate students to take statistics courses designed for statistics graduate students.

Summary of changes

Summarizing the main requests and observations:
- We should offer STAT 511 year round;
- We should find a way to deliver courses that minimize graduate student travel to main campus;
- 4 credit courses are hard to fit into most graduate programs and faculty are reluctant to tell students to take a 4 credit course in order to learn a specialized topic that is only part of the course content;
- Only a subset of students in STAT512 benefit from the project-oriented part of the course;
- There is a large demand for more courses that are more specialized in terms of characteristics of data and types of statistical models and methods;
- We should increase the range of topics covered in courses at a level past 511;
- We should keep prerequisites for the advanced courses a minimum.

Based on these items, we have developed plan with the main ingredients:

1) Changes to delivery and scheduling of STAT 511 that allow it to be offered in Fall, Spring, and Summer. Each Fall, we will offer two traditional sections of 4-credit STAT 511 meeting twice per week with enrollment capped at 55. We will record the videos for one of those sections. We will use the video recordings to offer "video-delivered" STAT 511 classes in the Spring and Summer.

2) Bringing STAT 512 back to its original purpose of training students who have their thesis data and are at the stage of doing analysis. There will continue to be at least one delivery of a traditional section of 4-credit STAT 512 meeting twice per week in the Spring, capped at an appropriate level.

3) Creating a suite of 2 credit topical courses on advanced statistics topics and applications of statistics at the level of STAT 512 offered on a rotating schedule that will be taken instead of or in addition to 512. The list of topics is based on feedback from campus and demand in other statistics graduate courses; course suggestions will be requested from the university community on an on-going basis. The courses with the highest indication of need will be offered in the 19-20 academic year.

Certificate Programs

The Certificate Programs offered by Statistics are being changed to reflect the changes to the graduate applied statistics curriculum and to take advantage of the many applied statistics courses offered across campus.

Stats in Session Seminars, Workshops, and Short-courses

The Graybill Statistical Laboratory faculty and students provides statistical collaboration and consulting resources in many forms along a spectrum including one-hour individual, general statistical consulting and long-term collaboration. These interactions include a mixture of applied statistics research and education/training. In the near future, the Stat Lab will provide additional applied statistics training via three modes of organized statistical consulting: seminars, workshops, and short-courses. If you would like to provide input on the topics to consider for future offerings, please navigate to: https://forms.gle/C7N91v42APVYTZ5b8

Based on feedback from 39 respondents, the first trainings will be offered for selected topics in software (R, SAS, JMP, SPSS; 79% of respondents indicated interest), multivariate methods (67% interest), regression (64% interest), mixed models (64% interest), and data management and visualization (64% interest). The respondents indicated that these addition training opportunities would enhance their research by allowing "…[them] to become more efficient in [their] data analysis and as a result analyze more data and/or try an additional approach" and providing "…[their] students and [them] additional resources and perspectives to analyze and understand [their] data."