EP.08.04
(Rev. 9/7/07)

PROPOSAL TO THE SENATE COMMITTEE ON EDUCATIONAL POLICY

Title: Undergraduate Minor in Statistics.

College Sponsor: Ann Mester, College of Liberal Arts and Sciences.

Sponsor: Jeffrey A. Douglas, Associate Professor, Department of Statistics, Phone: 244-7302, e-mail: jeffdoug@uiuc.edu

Brief Description: Knowledge of statistical methods and theory has become increasingly important to students in many disciplines on campus. This is reflected by the growing enrollment in Department of Statistics courses by non-majors. In an age in which more and more data can be collected, stored, and analyzed, numerous disciplines ranging from the life sciences, physical sciences, social sciences, engineering, and business are recognizing the rewards of gaining expertise in statistics in bolstering their research skills as well as in enhancing their career opportunities. To meet this demand the Department of Statistics would like to offer an undergraduate minor for those numerous non-majors who take a significant number of courses in Statistics. Both the applied and more mathematical track of the proposed minor require considerable depth and breadth in statistics. Coursework exposes students to statistical computation, theory of mathematical statistics, and many common techniques of statistical analysis. How this is achieved is discussed below in a description of the degree requirements.

Requirements:

To satisfy degree requirements, students must complete either the Applied or Mathematical Track.

Applied Statistics Track (18-21 hrs.)
1. Mathematics125 or 225 or 415
2. One of Statistics100, Sociology 280, Psychology 235, Agricultural and Consumer Economics 261, Economics 202, Crop Sciences 241, Educational Psychology 280
3. Statistics 200
4. Statistics 400 (or Statistics 408 and 409)
5. Statistics 420
6. One of Statistics 430, Community Health 474, Economics 471, Mathematics 471, Mathematics 477, Industrial Engineering 400, Psychology 407, Animal Sciences 445, Sociology 481, or other courses if approved by the advisor.

Mathematical Statistics Track (19 hrs.)
1. Mathematics 415
2. Statistics 200

3. Statistics 400 (or Statistics 408 and 409)
4. Statistics 410 or Electrical and Computer Engineering 413
5. Two of Statistics 420, 424, 425, 426, 427, 428, 429, 430, 456, or 458

The two different tracks reflect the level of linear algebra taken, as well as the number of applied versus mathematical statistics classes. Applied Statistics does not require Math 415, though does require at least a more basic course in linear algebra or matrix theory. Both tracks require Stat 200, which serves as an introduction to data analysis as well as an introduction to statistical computing.

The Applied and Mathematical Statistics tracks both require a calculus-based introduction to mathematical statistics, Stat 400. This implies that all students must complete the calculus sequence Math 221, 231, and 241 because they are prerequisites for the mathematical statistics required by both tracks. In both tracks, Stat 408 and Stat 409 can be taken to substitute for Stat 400. Stat 400 combines probability and mathematical statistics. The 408 and 409 sequence, primarily taken by actuarial science majors, covers very nearly the same material and mostly considers probability in 408 and mathematical statistics in 409.

The Mathematical Statistics track requires an additional course in mathematical statistics, Stat 410. In the mathematical track, ECE 413 can be taken in substitute for Stat 410. ECE 413 covers somewhat different material, with less mathematical statistics but more probability and stochastic processes, which is appropriate for the students who take this course, primarily ECE majors. Both a Stat 400 and Stat 410 sequence, and a STAT 400 and ECE 413 sequence, would prepare students for the remaining courses on this track.

The remaining courses in both tracks are courses in applied statistics, and prerequisites for enrollment in these courses depend largely on what linear algebra and mathematical statistics classes students have had, which essentially define which track a student is following.

Applied Statistics would be preferable to some students who have a particular area of application in mind, and might want a couple of their statistics courses offered with that area emphasized. So, more options outside of the Statistics Department are available. Of these courses from other departments, one is an introductory with no statistical prerequisites (Statistics100, Sociology 280, Psychology 235, Agricultural and Consumer Economics 261, Economics 202, Crop Sciences 241, Educational Psychology 280), and the other requires introductory statistics as a prerequisite (Statistics 430, Community Health 474, Economics 471, Mathematics 471, Mathematics 477, Industrial Engineering 400, Psychology 407, Animal Sciences 445, Sociology 481). Because we anticipate that the first course in statistics from another department might serve to interest students in the topic, and eventually result in their enrolling, we don't anticipated that a greater burden will be placed on those departments. Due to the many options for a second course, it is not likely that any one course will experience a substantial increase in its enrollment

due to the minor. The applied statistics courses for the Mathematical Statistics Track are offered by the Department of Statistics.

Prerequisites: To complete all required courses, students will need to take calculus through multivariable calculus. Stat 200 requires only first-semester calculus, and the following courses have no calculus prerequisites: Statistics100, Sociology 280, Psychology 235, Agricultural and Consumer Economics 261, Economics 202, Crop Sciences 241, Educational Psychology 280.

Expected Enrollment: Based on the number of non-majors taking a significant number of statistics classes, and the many inquiries we have gotten, we estimate that roughly 10-15 students will enroll in the minor each academic year. We expect minimal impact on library and other campus resources.

Admission: Students must contact the undergraduate advisor of the Department of Statistics for acceptance into the minor.

Minor Advisor: Jeffrey A. Douglas, Associate Professor, Department of Statistics.

Certification of Successful Completion: Will be verified by the Statistics Minor Advisor.

Douglas G. Simpson

Department of Statistics

College of Liberal Arts and Sciences

Office of the Provost

Statement for the catalog:

Minor In Statistics

The minor, administered by the Department of Statistics, is designed to provide students with an understanding of the concepts of statistical inference and a familiarity with the methods of applied statistical analysis. A minor in statistics will assist students with their major field of study to better prepare them for a career in their chosen field. It will also prepare students to for graduate studies in statistics or in one of many areas where data analysis plays an important role. Interested students should contact the Statistics undergraduate advisor for admission into the minor. Students should have completed the calculus sequence through MATH 241 before entering the minor. Students must choose from either the Applied or Mathematical Statistics Track.

Applied Statistics Track

Hours	Requirement
2-3	Choose one of the following: MATH 125- Elementary Linear Algebra MATH 225- Introductory Matrix Theory MATH 415- Linear Algebra
3-4	Choose one of the following: ACE 261- Applied Statistical Methods CPSC 241- Intro to Applied Statistics ECON 202- Economic Statistics I EPSY 280- Elements of Statistics PSYC 235- Intro to Statistics STAT 100- Statistics SOC 280- Intro to Social Statistics
3	STAT 200- Statistical Analysis
4	STAT 400- Statistics and Probability I [1]
3	STAT 420- Methods of Applied Statistics
3-4	Choose one of the following: ANSC 445- Statistical Methods CHLH 474- Principles of Epidemiology ECON 471- Intro to Applied Econometrics IE 400- Des and Anlys of Experiments MATH 471- Actuarial Theory I MATH 477- Survival Analysis PSYC 407- Statistical Methods II SOC 481- Survey Research STAT 430- Topics in Applied Statistics or a course approved by the advisor
18-21	Total

Mathematical Statistics Track

Hours	Requirement
3	MATH 415- Linear Algebra
3	STAT 200- Statistical Analysis
4	STAT 400- Statistics and Probability I[1]
3	Choose one of the following: STAT 410- Statistics and Probability II ECE 413- Probability with Engrg Applic
6	Choose two courses from the following: STAT 420- Methods of Applied Statistics STAT 424- Analysis of Variance STAT 425- Applied Regression and Design STAT 426- Sampling and Categorical Data STAT 427- Statistical Consulting STAT 428- Statistical Computing STAT 429- Time Series Analysis MATH 466- Probability Theory II ANSC 448- Math Modeling in Life Sciences
19	Total

1. Students who have completed STAT 408 and STAT 409 will not need to take STAT 400.