



Glassboro State College
Department of Mathematics

Proposal for a Course
Introduction to Probability and Statistics II
to be offered by the Department of Mathematics

I. Essence of the Proposal

This is a proposal to take a present 3 semester hour course, Introduction to Probability and Statistics, and expand it into a two course sequence: Introduction to Probability and Statistics I and II. Each of the two courses would be a 3 semester-hour course. The name of the present course, Introduction to Probability and Statistics would be changed to Introduction to Probability and Statistics I (requested in a separate communication to the Committee on Curriculum and Curriculum Evaluation).

This new course would have as a prerequisite, completion of Introduction to Probability and Statistics I. This course would be classified as an elective specialization course for Mathematics majors.

II. Details of the Proposal

1. Uniqueness of the course. At present, the subject matter in this course is not taught at Glassboro State College. Hence it would be unique.

2. Specific objectives of the course. The general objective of this course is to give the student an introduction to the theory and applications of mathematical statistics at the post-calculus level. This course, along with its prerequisite, is designed for (1) mathematics majors, to acquaint them with the field of statistics and (2) other majors who have need for a more thorough background in statistics than the

courses Elementary Statistics I and II provide.

In addition, completion of this course would furnish the theoretical statistical background needed for graduate-level study, either in statistics itself or in a field where statistics is used.

3. Scope of the course. This course will place emphasis on statistics. (Its prerequisite places emphasis on probability). A topical outline will include:

- a. Estimation: consistency, unbiasedness, maximum likelihood, confidence intervals, efficiency, sufficiency, Cramer-Rao Theorem, Rao-Blackwell Theorem.
- b. Testing Hypotheses: power functions, type I and II errors, Neyman-Pearson lemma, likelihood ratio tests, tests for means and variances.
- c. Regression and correlation.
- d. Chi-square tests.
- e. Non-parametric statistics.

The text used for this course will normally be the same one used for Probability and Statistics I, as most texts at this level are written for a two-semester sequence.

4. General statement of teaching methods. The teaching methods to be used will consist of lectures, discussions, and problem solving.

5. Methods of evaluation. The students will be evaluated and grades assigned on their demonstrated understanding of statistical theory and applications. This will normally be done via their performance on tests, homework problems, and in class and individual discussions.

III. Rationale

At the present time, a one semester 3-hour course is not sufficient to cover the relevant material needed to fulfill the objectives of the

course. Most of the present course (Introduction to Probability and Statistics) is concerned with probability (e.g. sample spaces, elementary probability, random variables, distributions, limit theorems, stochastic processes), and not enough time is available for the statistical theory. Indeed, most of the statistical theory and application has to be left out. Hence more time is needed to introduce the student to the science of statistics.

At most colleges and universities, introductory courses in probability and statistics at the post-calculus level requires two semesters in order to cover sufficient material to fulfill these same objectives.

Also, the Committee on the Undergraduate Program in Mathematics, Mathematical Association of America, recommends that two semesters (for a total of six semester hours) be spent covering this type and amount of material. The results of their studies and their recommendations are contained in Commentary on A General Curriculum in Mathematics for Colleges (1972).