Revised Course Proposal
MAT 2290G: Elementary Statistics, Honors

1. **Catalog Description**

    a. Course level: MAT 2290G

    b. Title: Elementary Statistics, Honors

    c. Credit: 4-0-4

    d. Term to be offered: On Demand

    e. Short Title: Elem Statistics

    f. Course Description: Descriptive and inferential statistics including measures of central tendency and dispersion, confidence intervals, and hypothesis testing. Recommended as a first course in statistics. Not open to mathematics majors.

    g. Prerequisites: MAT 1271 or satisfactory placement by department guidelines, and admission to the University Honors College.

    h. The course is writing active.

2. **Student Learning Objectives**

    a. *List student learning objectives that are designed to help students achieve one or more of the established goals of general education and university-wide assessment.*

    In completing this course, students will be able to:

      i. express themselves in the language of mathematics using correct mathematical exposition and symbolism *(writing)*.

     ii. create and interpret data charts and graphs *(critical thinking, writing)*.

    iii. choose and apply appropriate statistical techniques for analyzing solutions to real-world problems *(critical thinking, writing)*.

    iv. learn the social implications of applying correct vs. incorrect statistical tests and techniques *(citizenship)*.

    b. *Indicate additional student learning objectives, if any, that are designed to help students achieve the goals of the course and/or a particular discipline or program.*

Upon successful completion of this course, the students will:

   i. interpret the results of a statistical test or technique accurately.

  ii. gain a positive attitude towards mathematics by applying it to realistic social issues.

 iii. gain confidence in their problem solving ability.

 iv. prepare for more advanced course work in statistics.

3. Course Outline

The following is a sample syllabus. The textbook has a variety of topics that allows each instructor to tailor the course to their specific interests.

Weeks 1-2   **Introduction to Statistics**

- basic terminology
- levels of measurement
- uses and abuses of statistics
- types of sampling techniques (brief overview)

Weeks 3-4   **Descriptive Statistics**

- measures of central tendency
- measures of dispersion
- measures of position
- boxplots

Weeks 5-6   **Introduction to Probability**

- fundamentals and definitions of probability
- the addition and complement rules of probability
- independent vs. dependent sampling
- the multiplication and conditional rules of probability

Weeks 7-10   **Applications of Probability Distributions**

- general probability distributions
- binomial probability distributions
- uniform probability distributions
- normal probability distributions
  -Central Limit Theorem
  -approximating a binomial probability

Weeks 11-12   **Confidence Intervals and Sample Sizes**

- confidence intervals for the mean
- confidence intervals for the proportions

- confidence intervals for the variance and standard deviation
- sample sizes needed for estimating means, proportions, variances, and standard deviations

Weeks 13-14   **Introduction to Hypothesis Testing**

- fundamentals of hypothesis testing
- testing claims about means, for both large and small samples
- testing claims about proportions
- testing claims about variance and standard deviation
- testing claims about two sample means, variances, and proportions

Week 15   **Exploring Topics in Statistics**

(as time permits, choose topic(s) from list below)
- correlation
- regression
- non-parametric statistical tests
- multinomial experiments: Goodness-of-Fit

4. **Evaluation of Student Learning**

a. Evaluation may include frequent quizzes, 3{4 objective exams, written problem sets or data collection project(s), plus a exam. A writing project to meet the standards of the Honors Program will be included.

b. This course satisfies the criteria for a writing active course through the emphasis or correct mathematical writing needed to completely justify one's solution to problems posed and write interpretations of statistical results.

5. **Rationale**

a. The course develops critical thinking skills and the ability to apply mathematics to real-world situations. It will be placed in the Mathematics segment of the general education program.

b. This course has always been taught at the 2000 level, since the skills and concepts covered in the course require a more than minimal level of mathematical maturity. It is an introductory course in statistics which builds on students' skills in algebra and geometry.

    c. This course is a revision of MAT 2290C and should maintain the same curriculum identification number as MAT 2290C. This course does not duplicate any other course, even though statistics courses are offered in other departments. MAT 2290G emphasizes the mathematical concepts which support the study of statistics and the mathematical writing used to present solutions to problems. MAT 2290G does not duplicate the material in MAT 3701 and MAT 3702, since the latter are both calculus-based statistics courses, whereas MAT 2290G requires only a background in algebra and geometry.

    d. MAT 2290G or MAT 2250G is required for the following majors: business education, family and consumer sciences, biological science with teacher certification, clinical laboratory science. This course may be taken to satisfy the statistics requirement in the biological sciences. MAT 2290G is recommended in many programs as an introduction to statistical literacy.

6. **Implementation**

    a. The course will be taught by select faculty members in the Department of Mathematics.

    b. The text to be used is *Elementary Statistics*, 7th edition, by Mario F. Triola; Addision-Wesley, 1998.

    c. There are no additional costs to the student.

    d. Term to be first offered: Spring 2001.

7. **Community College Transfer**

A community college course may be judged equivalent to this course.

8. **Date Approved by the Department:** 4/10/00

9. **Date Approved by the College Curriculum Committee:** 4/21/00

10. **Date Approved by CAA:** 10/19/00

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