

Program Cover Document --- STA 305: Regression Analysis

I. Basic Course Information

STA 305 is a required upper-level statistics course, both for statistics majors and statistics minors. It will be scheduled for two 80-minute lecture periods. Prerequisites: STA 215 or STA 216 or (ECO 105 and (MAT 125 or MAT 127)) or (STA 145 and MAT 127).

II. Learning Goals

The American Statistical Association's guidelines for undergraduate programs in statistical science state that such programs should "emphasize concepts and tools for working with data and provide experience in designing data collection and in analyzing real data that goes beyond the content of a first course in statistical methods." More specifically, they recommend that programs should provide statistical topics that include statistical modeling e.g. simple, multiple and logistic regression, and that programs should require familiarity with a standard statistical software package.

In statistical science the most important analytic tool for examining the relationships between two or more variables is regression analysis. For example, social researchers may inquire "Are changes in the unemployment rate associated with changes in the President's popularity at the polls?" Business researchers may want to know how much advertising is necessary to achieve a certain level of sales. Real estate companies may wish to investigate factors that explain variations in selling prices from house to house. These examples are all instances of statistical modeling.

STA 305 will equip students with skills in modeling that they can utilize and build on in flexible ways at both graduate school and in future employment. It will emphasize real data and authentic applications and will present data in a context that is both meaningful to students and indicative of the field of science underlying the data. The course will encourage synthesis of theory, methods and application, and will include extensive experience with statistical computing.

On completion of this course students should have achieved the following learning goals:

- (i) A clear understanding of the theoretical development of statistical techniques.
- (ii) The selection of appropriate techniques in given contexts.
- (iii) The skills to apply regression techniques to a wide variety of real-life problems.
- (iv) The practice of assessing applicability and reasonableness of analytic results.
- (v) The ability to provide correct interpretations of results and to recommend appropriate decisions.
- (vi) The possession of strong computing skills and familiarity with statistical software.
- (vii) The possession of skills directed to the communication of statistical results to a variety of audiences.

III. Student Assessment

Students will receive regular feedback on their work through the assignment of homework, quizzes, student presentations and examinations. The specific choice will depend upon the individual instructor. Through this feedback, students will be able to see and correct their misunderstandings and improve their performance. Student performance on these assessment instruments and the performance of students in their statistics options will be used to assess the success of Regression Analysis in achieving its learning goals.

IV. Learning Activities

Learning activities will consist of a combination of lectures, group work, student presentations and computer assignments. The specific choice will depend upon the individual instructor. Outside class, students are expected to do a significant amount of individual and group homework to achieve the learning goals. By giving students a variety of ways and means to conduct statistical analyses, the learning activities promote a deeper understanding of the concepts of regression analysis and contribute to the learning goals of these programs.

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