

STATISTICS COURSE DESCRIPTIONS

STAT 140: INTRODUCTION TO STATISTICS (4)

Topics are methods of description, measures of location and dispersion, simple linear regression, normal distributions, sampling distributions, interval estimation, and significance tests of proportions. Applications in both physical and social sciences. Use of a statistical computer package required.

STAT 251, 252: STATISTICAL METHODS I, II (4, 4)

Statistical inference for controlled experiments. Use of a statistical computer package required. Term 1: measures of central tendency and dispersion; elementary probability theory, normal, binomial, and t-distributions; sampling distributions; estimation and significance testing, linear regression and correlation, and commonly used transformations. Term 2: multiple regression, inference for regression, analysis of variance, nonparametric tests, logistic regression, and experimental design as time permits. Prerequisites: for STAT 251: appropriate score on math placement test or one course in college mathematics above MATH 140; for STAT 252: STAT 251.

STAT 251: STATISTICAL METHODS I (4)

Statistical inference for surveys and controlled experiments. Use of a statistical computer package required. Measures of central tendency and dispersion, normal, binomial, and t-distributions; Fisher's exact test, sampling distributions; estimation and significance testing; analysis of variance; linear regression and correlation and commonly used transformations. Prerequisite: appropriate score on placement exam, or one course in college mathematics above MATH 140.

STAT 252: STATISTICAL METHODS II (2 or 4)

Bootstrapping; multiple regression, inference for regression, analysis of variance, nonparametric tests, logistic regression, time series, and experimental design as time permits. Prerequisite: STAT 251.

STAT 350: SPECIAL TOPIC - ADVANCED STATISTICS (2)

Advanced topics in statistical analysis including multiple, Poisson and logistic regression, time series analysis, survival analysis, non-parametric tests, inference for regression, principle component analysis, and Bayesian data analysis. Use of Minitab (statistical software) required. Prerequisite: STAT 251.

STAT 350: SPECIAL TOPIC - BIOSTATISTICS (2)

This course is designed to provide students with statistical tools that are widely used in life sciences. The course should equip students to read research literature in the biosciences, to plan their own undergraduate research, and to analyze their research data. We use methods and activities that make statistics lively and interesting to students and that help students learn statistical thinking, and include modern, computing-intensive techniques that have been adopted by scientists and engineers. The course emphasizes data and concepts over theory and formulas and employs active learning through lab exercises, projects, group problem solving and discussion, and demonstrations based on data generated in class. The major statistical techniques covered include the Poisson distribution, bootstrap confidence intervals, discussion of sample size and power in hypothesis testing, design of experiments, analysis of variance, and logistic regression. Prerequisite: STAT 140 or STAT 251.

STAT 350: SPECIAL TOPIC - INTRODUCTION TO ACTUARIAL SCIENCE (2)

In this course we develop a knowledge of the fundamental statistical tools for quantitatively assessing risk. Emphasis is on the applications of these tools to problems encountered in actuarial science. We'll apply calculus to compound interest and insurance functions. Topics covered may include interest compounded discretely and continuously; force of interest function; annuities payable discretely and continuously; bonds and yield rates;

and life tables, life annuities, and single and annual premiums for insurance and annuities. Prerequisite: MATH 241. Pre- or corequisite: MATH 242.

STAT 350: SPECIAL TOPIC – REGRESSION ANALYSIS (2)

The analysis of continuous response data. The focus is on linear and multiple regression with theoretical and practical training in statistical modeling. A hands-on, applied course where students will become proficient using computer software to analyze data drawn from a variety of fields, and will learn what assumptions underlie the models, how to test whether the data meet the assumptions, and what can be done when the assumptions are not met. Prerequisites: STAT 140 or STAT 251, or equivalent.

STAT 352: PROBABILITY (4)

Mathematical probability; univariate and multivariate distributions; moments and moment generating functions; limit theorems and stochastic processes. MATH 254 and 255 are recommended. Prerequisite: MATH 242.