

STATISTICS (STAT)

STAT 2163 Introduction to Statistical Methods

ACTS Common Course - MATH 2103.

Prerequisite: MATH 1003, MATH 1113, or consent of the instructor.

Descriptive statistics, random variables, probability and sampling distributions, estimation, hypothesis testing, regression, analysis of variance, non-parametric techniques. May not be taken for credit after completion of STAT 3153.

Note: A grade of C or better must be earned in this course if being used to satisfy the general education mathematics requirement.

STAT 2304 Programming Languages for Data Science

Prerequisite: Any introductory statistics course.

The goal of this course is to introduce the basic computer programming using Python and R to the undergraduate students who are interested in working in the rapidly growing fields of data science and data analytics.

Python and R are two open-source programming languages with a large data scientist community. This course will introduce the basic programming skills and tools necessary to efficiently collect, process, visualize, and analyze the datasets. Hands-on projects will be given to help students gain experience with software packages.

STAT 3113 Regression Analysis

Prerequisite: Any introductory statistics course or permission of instructor.

This course introduces the methods for fitting and interpreting regression models. Topics include simple linear regression (SLR), multiple linear regression (MLR), model checking, variable selection methods, dummy variables, diagnostic measures, logistic regression, and time series analysis. Instruction will include the use of statistical programming language.

STAT 3153 Applied Statistics

Prerequisite: MATH 2924.

A balanced approach emphasizing both theory and applications will be taken. Topics include descriptive statistics, exploratory data analysis, probability and probability models, discrete and continuous random variables, confidence intervals, hypothesis testing, and control charts. Students will be required to collect data, use a current statistical software package to analyze the data, and make inferences based upon the data analysis as part of an individual and/ or group project.

Note: A grade of C or better must be earned in the course used to satisfy the general education mathematics requirement.

STAT 3183 Statistical Process Control

Offered: Spring.

Prerequisite: An introductory statistics course or permission of instructor.

Statistical process control is an important topic for anyone interested in applying statistics in industry. This course focuses on theory and methods of quality monitoring including process capability, control charts, acceptance sampling, quality engineering, and quality design.

STAT 3203 Actuarial Probability I

Offered: Fall.

Prerequisite: MATH 2934.

In this course we develop knowledge of the fundamental probability tools for quantitatively assessing risk. The application of these tools to problems encountered in actuarial science is emphasized. A thorough command of the supporting calculus is assumed. A very basic knowledge of insurance and risk management is assumed.

STAT 3213 Actuarial Probability II

Offered: Spring.

Prerequisite: STAT 3203.

This course is a continuation to STAT 3203. At the end of the course, a student is prepared to take Exam P of the Society of Actuaries.

STAT 4113 Categorical Data Analysis

Offered: Fall.

Prerequisite: STAT 3113 or permission of instructor.

Statistical tools to analyze univariate and multivariate categorical responses. Emphasis is given to Generalized Linear Models, including logistic regression and loglinear models.

STAT 4153 Experimental Design and Analysis

Prerequisite: Any introductory statistics course or permission of instructor, and junior standing or above.

This course introduces students to both design and analysis of experiments as well as statistical computing. Emphasis is given to develop an understanding of experimental methods and major experimental designs. Students will be required to design and carry out an experiment, use a current statistical software package to analyze the data, and make inferences based upon the analysis.

STAT 4163 Mathematical Statistics

Prerequisite: STAT 3153.

This is an introductory course in mathematical statistics. Topics include distribution functions (both discrete and continuous), multivariate distributions, distributions of functions of random variables, and statistical inference.

Note: A grade of C or better must be earned in the course used to satisfy the general education mathematics requirement.

STAT 4173 Advanced Biostatistics

Prerequisite: An introductory statistics course or permission of instructor.

This course will include analysis of variance, one factor experiments, experimental design with two or more factors, linear and multiple regression analysis, and categorical data analysis.

Note: A grade of C or better must be earned in the course used to satisfy the general education mathematics requirement.

STAT 4283 Financial Mathematics I

Offered: Fall.

Prerequisite: MATH 2914.

This is an introductory course in Financial Mathematics. The student will learn about the different types of interest (simple interest, discount interest, compound interest), annuities, debt retirement methods, and investing in stocks and bonds.

STAT 4293 Financial Mathematics II

Offered: Spring.

Prerequisite: MATH 4283.

This is a continuation of STAT 4283. Topics include loans, bonds, cash flow and portfolios, immunization, derivatives and options. At the end of this course, a student is prepared to take Exam FM of the Society of Actuaries.

STAT 4383 Machine Learning

Offered: Fall.

Prerequisite: MATH 2914 and 4003.

This course is directed towards advanced undergraduates in statistics, mathematics, or related quantitative fields. The focus of the course is an accessible overview of the field of machine learning and provide the students with valuable hands-on experience by illustrating how to implement each of the machine learning methods using Python. Topics covered include Decision Tree, Support Vector Machines, and the kernel methods, AdaBoost and GBDT method, Logistic regression, and neural network, and more.

STAT 4393 Statistical Learning

Offered: Spring.

Prerequisite: STAT 3113 or permission of instructor.

This course is directed towards advanced undergraduates or master's students in statistical or related quantitative fields. The focus of the course is an accessible overview of the field of statistical learning and provide the students with valuable hands-on experience by illustrating how to implement each of the statistical learning methods using R or other statistical programming language. Topics covered include: regression techniques, classification methods, linear model selection and regularization, unsupervised learning, and more.

STAT 5113 Categorical Data Analysis

Offered: Fall.

Statistical tools to analyze univariate and multivariate categorical responses. Emphasis is given to Generalized Linear Models, including logistic regression and loglinear models.

Note: May not be taken for credit after completion of STAT 4113 or equivalent.

STAT 5153 Experimental Design Analysis

This course introduces students to both design and analysis of experiments as well as statistical computing. Emphasis is given to develop an understanding of experimental methods and major experimental designs. Students will be required to design and carry out an experiment, use a current statistical software package to analyze the data, and make inferences based upon the analysis.

Note: May not be taken for credit after completion of STAT 4153 or equivalent.

STAT 5383 Machine Learning

Offered: Fall.

The focus of the course is an accessible overview of the field of machine learning and provide the students with valuable hands-on experience by illustrating how to implement each of the machine learning methods using Python. Topics covered include Decision Tree, Support Vector Machines, and the kernel methods, AdaBoost and GBDT method, Logistic regression, and neural network, and more.

Note: May not be taken for credit after completion of STAT 4383 or equivalent.

STAT 5393 Statistical Learning

Offered: Spring.

This course is directed towards advanced undergraduates or master's students in statistical or related quantitative fields. The focus of the course is an accessible overview of the field of statistical learning and provide the students with valuable hands-on experience by illustrating how to implement each of the statistical learning methods using R or other statistical programming language. Topics covered include: regression techniques, classification methods, linear model selection and regularization, unsupervised learning, and more.

Note: May not be taken for credit after completion of STAT 4393 or equivalent.