

STA: Statistics Courses

Courses

STA 2023 Elements of Statistics

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

In this course students will utilize descriptive and inferential statistical methods in contextual situations, using technology as appropriate. The course is designed to increase problem-solving abilities and data interpretation through practical applications of statistical concepts. This course is appropriate for students in a wide range of disciplines and programs. Student Learning Outcomes: • Students will visualize and summarize data using descriptive statistics. • Students will apply basic probability concepts to draw reasonable conclusions. • Students will employ concepts of random variables, sampling distributions, and central limit theorem to analyze and interpret representations of data. • Students will choose an appropriate method of inferential statistics, including confidence intervals and hypothesis testing, to make decisions about a population based on sample data. • Students will model linear relationships between quantitative variables using correlation and linear regression. Meets General Education requirement in Mathematics. Meets College-Level Computation Skills Requirement.

STA 2360 Introduction to Data Science

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

This is a first course in data science at the undergraduate level. In addition to data ethics, the data science cycle will be covered, including data wrangling, exploratory data analysis, data visualization, predictive modeling, and communicating results. An emphasis will be placed on conducting reproducible research ready for dissemination. This course will provide an overview of common topics in data science. No prior programming or statistics experience is necessary for this course. Meets General Education requirement in Mathematics. Meets College-Level Computation Skills Requirement.

STA 3162C Applied Statistics

College of Sci and Engineering, Department of Mathematics & Statistics

4 sh (may not be repeated for credit)

Prerequisite: MAC 2311 OR STA 2023

Inferential statistics from an applied point of view. Probability and sampling distributions, confidence intervals and hypothesis testing, ANOVA, correlation, simple and multiple linear regressions. SAS computer techniques. Lab required. Meets College-Level Computation Skills Requirement.

STA 3905 Directed Study

College of Sci and Engineering, Department of Mathematics & Statistics

1-12 sh (may be repeated indefinitely for credit)

STA 4012 Data Awareness

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

Data Awareness is a course that covers the essentials of data fluency and awareness from the perspective of the consumer of statistics. This 16-week asynchronous online course builds the fundamentals of statistics necessary for data description and analysis to enable data-driven decision-making in the context of the student's discipline. Offered concurrently with STA 5015. Graduate students will be assigned additional work.

STA 4051 Nonparametric Statistics

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

Prerequisite: STA 2023 OR MAC 2311 OR MAC 2233

The nonparametric or distribution-free methods can be useful in cases such as (i) no assumptions about the underlying population distribution is made, (ii) the data can be categorical or ranked, such as good or bad. This course provides an introduction of some key concepts of nonparametric statistics. Students will learn Why, When, and How to apply nonparametric techniques. This course covers several nonparametric tests as it is described below in Topics.

STA 4091 Data Fluency

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

Prerequisite: STA 4012 OR STA 4121 OR STA 3162C OR STA 4173 OR STA 4222

Data fluency is a course that guides students through an exploration of data including data integration, ethical considerations, identification of a problem of interest, interpretation of results, and written and oral presentations of findings. This 16-week asynchronous online course guides students through the applications of the fundamentals of statistics necessary for data description and analysis to enable data-driven decision-making in the context of the student's discipline.

STA 4121 Statistics for Data Science I

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

Statistics for Data Science I is the first course in statistics for students in data science. This 8-week asynchronous online course builds the fundamentals of statistics necessary for students to perform and interpret appropriate hypothesis tests using softwares based on the data and research questions at hand. Offered concurrently with STA 5126. Graduate students will be assigned additional work including professional reports.

STA 4173 Biostatistics

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

Prerequisite: STA 2023

A second course in statistics for students in the Biological Sciences. Topics covered include analysis of variance, regression analysis, nonparametric statistics, contingency tables. Offered concurrently with STA 5176; graduate students will be assigned additional work. Meets College-Level Computation Skills Requirement.

STA 4222 Sampling Theory

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

Prerequisite: MAC 2311 OR STA 2023

A first course in sampling methods with application to survey sampling and field sampling. Topics include simple random sampling, stratified sampling, cluster sampling, systematic sampling, and adaptive sampling and corresponding estimates for these sampling designs.

STA 4231 Statistics for Data Science II

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

Prerequisite: STA 4121 OR STA 4173 OR STA 3162C

Statistics for Data Science II is a second course in statistics for students in data science. This course covers the application of regression analysis techniques using softwares for statistical analysis. Broadly, students will learn how to construct statistical models and disseminate results to a wide audience. There will be a focus on choosing the appropriate modeling strategy for the data and research questions at hand. Offered concurrently with STA 5232. Graduate students will be assigned additional work including conclusions based on statistical inference.

STA 4234 Regression Analysis

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

Prerequisite: STA 2023 OR STA 3162C

Simple Linear Regression, Multiple Linear Regression, Model Adequacy Checking, Transformations and Weighting to Correct Model Inadequacies, Diagnostics for Leverage and Influence, Polynomial Regression Models, Indicator Variables, Multicollinearity, Variable Selection and Model Building, Validation of Regression Models, Introduction to Logistic Regression.

STA 4321 Introduction to Mathematical Statistics I

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

Prerequisite: MAC 2311 AND MAC 2312

Probability, conditional probability, distributions of random variables, distribution of functions of random variables, limiting distributions, multivariate probability distributions. Meets College-Level Computation Skills Requirement.

STA 4905 Directed Study

College of Sci and Engineering, Department of Mathematics & Statistics

1-12 sh (may be repeated indefinitely for credit)

STA 5015 Data Awareness

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

Data Awareness is a course that covers the essentials of data fluency and awareness from the perspective of the consumer of statistics. This 16-week asynchronous online course builds the fundamentals of statistics necessary for data description and analysis to enable data-driven decision-making in the context of the student's discipline. Offered concurrently with STA 4012. Graduate students will be assigned additional work.

STA 5108 MathStat Tools

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

MathStat Tools will cover computer-oriented statistics projects using various software programs. This course provides students with a fundamental hands-on experience with SAS, R, Matlab, and Latex. Topics include data manipulation and management, statistical and mathematical functions, and common statistical procedures and techniques. Successful completing assignments require a mix of computing and statistics/mathematics.

STA 5126 Statistics for Data Science I

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

Statistics for Data Science I is the first course in statistics for students in data science. This 8-week asynchronous online course builds the fundamentals of statistics necessary for students to perform and interpret appropriate hypothesis tests using softwares based on the data and research questions at hand. Offered concurrently with STA 4121. Graduate students will be assigned additional work including constructing professional reports.

STA 5176 Statistical Modeling

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

This course will provide further examination of statistics and data analysis beyond an introductory course. Topics covered include data visualization, point, and interval estimation, hypothesis testing of means, variances, and proportions, and linear and logistic regressions. Emphasis will be placed on conducting reproducible research. Credit may not be received in both STA 5126 and STA 5176.

STA 5232 Statistics for Data Science II

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

Prerequisite: STA 5126 OR STA 5176

Statistics for Data Science II is a second course in statistics for students in data science. This course covers the application of regression analysis techniques using softwares for statistical analysis. Broadly, students will learn how to construct statistical models and disseminate predictions and results to a wide audience. There will be a focus on choosing the appropriate modeling strategy for the data and research questions at hand. Offered concurrently with STA 4231. Graduate students will be assigned additional work including conclusions based on statistical inference.

STA 5326 Statistical Inference

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

This course is an advanced course in mathematical statistics. It is more theoretical than an applied statistics course and takes a mathematical approach to problem solving. Some theorems will be proved. There will be some "real world" applications of the theory.

STA 5905 Directed Study

College of Sci and Engineering, Department of Mathematics & Statistics

1-12 sh (may be repeated indefinitely for credit)

STA 6094 Data Fluency

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

Prerequisite: STA 5015 OR STA 5126 OR STA 5176 OR STA 5326

Data fluency is a course that guides students through an exploration of data including data integration, ethical considerations, identification of a problem of interest, interpretation of results, and written and oral presentations of findings. This 16-week asynchronous online course guides students through the applications of the fundamentals of statistics necessary for data description and analysis to enable data-driven decision-making in the context of the student's discipline.

STA 6232 Statistics for Data Science II

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

Prerequisite: STA 5126 OR STA 5176

Statistics for Data Science II is a second course in statistics for students in data science. This course covers the application of regression analysis techniques using softwares for statistical analysis. Broadly, students will learn how to construct statistical models and disseminate predictions and results to a wide audience. There will be a focus on choosing the appropriate modeling strategy for the data and research questions at hand. Conclusions will be drawn based on statistical inference and students will be expected to organize and present a project based on the findings.

STA 6235 Modeling in Regression

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

Prerequisite: STA 5176

This is a deeper dive into regression analysis. Students will learn how to construct statistical models and disseminate results to a wide audience. There will be a focus on choosing the appropriate modeling strategy for the data and research question(s) at hand as well as the underlying matrix algebra.

STA 6246 Design and Analysis of Experiments

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

Further concepts in design and analysis of planned experiments with emphasis on confounding and fractional replications of factorial experiments; composite designs; incomplete block designs; estimation of variance components.

STA 6257 Advanced Statistical Modeling

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

This course will cover advanced statistical models, enabling students to model various discrete and continuous outcomes. The focus will be determined by instructor and may include such analyses as generalized linear analysis, nonlinear regression analysis, or spatial cluster analysis. In addition to advanced models, the course will include model constructions, model fit, interpretation of results, and dissemination of results.

STA 6349 Applied Bayesian Analysis

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

Prerequisite: MAP 5471

This course is an applied course in Bayesian data analysis. After reviewing basic probability theory, including marginal and conditional probabilities, Bayes' Theorem will be reviewed and students will learn how to analyze data under the Bayesian framework using prior and data distributions to construct posterior distributions. While many probability distributions will be discussed, emphasis will be placed on the beta-binomial and normal-normal models. Basic simulations will be conducted to estimate posterior distributions and predict the probabilities of outcomes.

STA 6507 Nonparametric Statistics

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

This course covers concepts of nonparametric statistics. Students will learn Why, When, and How to apply nonparametric techniques. It covers several nonparametric techniques such as bootstrap techniques, Goodness-of-Fit tests, binomial based test, ranks based test. Students will also learn and use R to practice nonparametric statistics.

STA 6666 Statistical Quality Control I

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

Procedures used in acceptance sampling and statistical process control are based on concepts and theory from probability and statistics. Introduces the applications of these procedures, investigates them from the standpoint of their statistical properties and develops the methodology for construction, evaluation and comparison of procedures.

STA 6707 Multivariate Methods

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

This course provides some of the concepts and methods of Multivariate analysis in order to describe and analyze multivariate data. Students will be introduced to multivariate extensions of Chi-Square and t-tests; discrimination and classification procedures; applications to diagnostic problems in biological, medical, anthropological and social research; multivariate analysis of variance; factor analysis and principal components analysis.

STA 6856 Time Series Analysis

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

Time series data are time-oriented data that can be used to forecast future values or to analyze data. This course provides students with a fundamental understanding of the nature and basic processes used to analyze such data. This course also introduces the theory and practice of time series analysis, with an emphasis on practical skills. Successful completion of assignments requires a mix of computing and statistics/mathematics.

STA 6905 Directed Study

College of Sci and Engineering, Department of Mathematics & Statistics

1-12 sh (may be repeated indefinitely for credit)

STA 6912 Statistics Research 1

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

This course gives students the opportunity to engage in group and independent research projects. Research topics and materials vary according to instructor. Technical reports and oral presentations are expected of each student. Students must have completed 15 hours of graduate course work in the program and have maintained at least a 3.0 GPA. Students must also commit to both fall and spring sections of the course.

STA 6913 Statistics Research 2

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

Prerequisite: STA 6912

This course gives students the opportunity to engage in group and independent research projects. Research topics and materials vary according to instructor. Technical reports and oral presentations are expected of each student.

STA 6950 Capstone Projects in Statistics

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

This course will give students the opportunity to engage in group and independent research projects. Research topics and materials vary according to the instructor with the thrust being applied or theoretical Statistics. Technical reports and oral presentations will be expected of each student.

STA 6971 Thesis

College of Sci and Engineering, Department of Mathematics & Statistics

1-6 sh (may be repeated for up to 8 sh of credit)

Graded on satisfactory / unsatisfactory basis only. Permission is required.