Statistics (STAT)

Course information contained within the Bulletin is accurate at the time of publication in June 2025 but is subject to change. For the most up-to-date course information, please refer to the Course Catalog.

STAT 0826. Statistics in the News. 4 Credit Hours.
Ever feel overwhelmed by the amount of information we have access to? Not sure whom to believe? This course provides students with the skills and knowledge to discern truth from fiction (and what lies in between) as they engage in rich discussions on current events. Students learn how to understand, evaluate, and criticize information from surveys and scientific studies encountered in newspapers, magazines, textbooks, and scholarly journals. They learn how to distinguish between informative and misleading uses of statistics and make informed decisions in the face of complexity and uncertainty. The focus is on understanding statistics and statistical ideas, not on statistical methodology (although this is also part of the course). Numerous supportive examples taken from a variety of fields in the social, behavioral, and natural sciences accompany each method and concept. NOTE: This course fulfills the Quantitative Literacy (GQ) requirement for students under GenEd and a Quantitative Reasoning (QA or QB) requirement for students under Core.

Course Attributes: GQ

Repeatability: This course may not be repeated for additional credits.

STAT 0827. Statistical Reasoning & Games of Chance. 4 Credit Hours.
This is a beginning course in probability and statistics with special emphasis on the critical analysis of games of chance. The objectives of the course are to introduce several quantitative concepts with real-life applications. These applications are related to situations that involve fallacies in reasoning, equity markets and games of chance. NOTE: This course fulfills the Quantitative Literacy (GQ) requirement for students under GenEd and a Quantitative Reasoning (QA or QB) requirement for students under Core.

Course Attributes: GQ

Repeatability: This course may not be repeated for additional credits.

STAT 1001. Quantitative Methods for Business I. 3 Credit Hours.
Fundamentals of mathematics and Excel are necessary for a student to pursue their degree at the Fox School of Business and Management. Topics and illustrations are specifically directed to applications in business and economics throughout this course. The overarching theme of this class is to solidify foundational quantitative and Excel skills and use those skills to solve relevant business applications.

Course Attributes: QA

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of C- in (any MATH course numbered 0701 to 0702, 'Y' in STA1, 'Y' in STA2, MATH 1011, MATH 1021, 'Y' in ST1A, 'Y' in ST2A, or SCTC 1021)

STAT 1102. Quantitative Methods for Business II. 4 Credit Hours.
Fundamentals of mathematics and Excel are necessary for a student to pursue their degree at the Fox School of Business and Management. Topics and illustrations are specifically directed to applications in business and economics throughout this course. The overarching theme of this class is to prepare students to be proficient in areas of quantitative analysis, and to use those skills to solve relevant business applications. The course will also include broader and deeper applications of the topics from STAT 1001. Excel will be used to reinforce topics and present solutions.

Course Attributes: QB

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of C- in (MATH 1022, STAT 1001, 'Y' in STA2, 'Y' in STT2, or 'Y' in ST2A)

STAT 1902. Honors Quantitative Methods for Business II. 4 Credit Hours.
Fundamentals of mathematics and Excel are necessary for a student to pursue their degree at the Fox School of Business and Management. Topics and illustrations are specifically directed to applications in business and economics throughout this course. The overarching theme of this class is to prepare students to be proficient in areas of quantitative analysis, and to use those skills to solve relevant business applications. The course will also include broader and deeper applications of the topics from STAT 1001. Excel will be used to reinforce topics and present solutions.

Course Attributes: HO, QB

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of C- in (MATH 1022, STAT 1001, 'Y' in STA2, 'Y' in STT2, or 'Y' in ST2A)

STAT 2103. Statistical Business Analytics. 4 Credit Hours.
This course will cover the fundamentals of data description, data analysis, and graphical methods with applications to business problems. Topics include random variables, discrete and continuous distributions, estimation of parameters, and hypothesis testing. Students will gain proficiency in simple and multiple regression models and forecasting. Excel will be used for data analysis and to reinforce topics taught in class.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of C- in (MATH 1022, STAT 1001, 'Y' in STA2, 'Y' in STT2, MATH 1021, or 'Y' in ST2A) and (STAT 1102, STAT 1902, MATH 1031, MATH 1041, MATH 1941, MATH 1038, 'Y' in STT3, or 'Y' in MATW)

STAT 2104. Selected Topics in Statistical Business Analytics. 1 Credit Hour.
Statistics 2104 is a one credit hour course that covers probability rules, joint and conditional probability, inference, confidence intervals, hypothesis tests, two sample design, simple linear regression, inference for regression, and multiple regression. NOTE: This course is designed for transfer students who have successfully completed a 3 credit hour introductory statistics course. This one credit hour course will bridge the gap between a 3 credit hour introductory statistics course taken at another institution, and the 4 credit hour Statistics 2103 (Business Statistics) course at Fox. Prior to fall 2014, the title of STAT 2104 was "Selected Topics in Business Statistics."

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of C- in (STAT 2101, STAT 2901, MATH 1013, CEE 3048, PSY 1167, SOC 1167, STAT 2512, PSY 2168, or ECE 3522)

STAT 2501. Quantitative Foundations for Data Science. 3 Credit Hours.
This course will cover topics in probability, statistics, and other quantitative concepts for data science. This course will allow students to acquire knowledge necessary in understanding concepts in statistical theory and methods. Students will apply quantitative analysis, critical thinking and interpretation to real-life problems in diverse areas, like business, engineering, healthcare, etc.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of C- in (MATH 1041, MATH 1941, or 'Y' in MATW) and (MATH 1042, MATH 1942, or 'Y' in MATW)

STAT 2521. Data Analysis and Statistical Computing. 3 Credit Hours.
This course presents practical applications of statistical methods using software. The emphasis is on giving students experience in solving real life problems using appropriate statistical methods. Statistical techniques studied include organization and presentation of data, statistical testing, multiple regression, Chi-Square tests and logistic regression. Case studies and projects, with applications, are used to show the application of statistical methods to business problems. Through this course students should be able to select, utilize and apply quantitative statistical methods to real life problems, and get familiar with data analysis using statistical software. The main statistical software we use is SPSS. Students will also be exposed to other packages, such as Excel and R.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of C in (STAT 2103, STAT 2903, MATH 3031, STAT 2104, SOC 1167, CEE 3048, PSY 1167, PSY 2168, AS 2101, AS 2505, ECE 3522, SOC 0825, ANTH 0825, POLS 0825, PSY 0825, PSY 1003, 'Y' in CRST03, 'Y' in CRST06, 'Y' in CRMA16, 'Y' in CRSO02, 'Y' in CRCE01, 'Y' in CRAS02, 'Y' in CREE01, 'Y' in CRSO01, 'Y' in CRPO01, 'Y' in CRPS02, 'Y' in CRST08, or 'Y' in CRPS05)

STAT 2522. Survey Design and Sampling. 3 Credit Hours.
This course presents the principal applications of sample surveys, survey design, criteria of a good sample design, and characteristics of simple random sampling, stratified random sampling, and cluster sampling. Case studies are used where appropriate to illustrate applications of survey sampling. Emphasis will be placed on both the theory and methodology of surveying and include sampling principles, sample design, questionnaire construction, and response problems.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of C in (STAT 2103, STAT 2903, MATH 3031, STAT 2104, SOC 1167, CEE 3048, PSY 1167, PSY 2168, AS 2101, AS 2505, ECE 3522, SOC 0825, ANTH 0825, POLS 0825, PSY 0825, PSY 1003, 'Y' in CRST03, 'Y' in CRST06, 'Y' in CRMA16, 'Y' in CRSO02, 'Y' in CRCE01, 'Y' in CRAS02, 'Y' in CREE01, 'Y' in CRSO01, 'Y' in CRPO01, 'Y' in CRPS02, 'Y' in CRST08, or 'Y' in CRPS05)

STAT 2523. Design of Experiments and Quality Control. 3 Credit Hours.
The first part of this course provides students with insight into statistically designed experiments and related topics. The course covers the fundamental statistical concepts required for designing efficient experiments to answer real questions. The fundamental concepts of replication, blocking, and randomization are examined. Topics covered include block designs, balanced incomplete block designs, and Latin Square designs. Additional topics include factorial experiments, fractional factorial designs, and orthogonal arrays. The course also introduces students to response surface methodology, mixture designs, and conjoint analysis. Quality improvement can be accomplished using experimental design principles. The second part of the course covers the core principles of the management of quality in the production of goods and services. Statistical quality control techniques are used in the implementation of these principles. Topics covered include control charts, cusum procedures, and Taguchi methods.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of C in (STAT 2103, STAT 2903, MATH 3031, STAT 2104, SOC 1167, CEE 3048, PSY 1167, PSY 2168, ECE 3522, SOC 0825, ANTH 0825, POLS 0825, PSY 0825, AS 2101, AS 2505, PSY 1003, 'Y' in CRST03, 'Y' in CRST06, 'Y' in CRMA16, 'Y' in CRSO02, 'Y' in CRCE01, 'Y' in CRAS02, 'Y' in CREE01, 'Y' in CRSO01, 'Y' in CRPO01, 'Y' in CRPS02, 'Y' in CRST08, or 'Y' in CRPS05)

STAT 2903. Honors Statistical Business Analytics. 4 Credit Hours.
This course provides students with the fundamental concepts and tools needed to understand the role of statistics and business analytics in organizations. It covers basic descriptive statistics, probability, and statistical inference. Topics include probability distributions, random sampling and sampling distributions, point and interval estimation, and hypothesis testing. The course also covers hypothesis testing for several populations, correlation, simple linear regression, multiple regression, and an introduction to data mining. Use of Excel for data analysis and inference. NOTE: This course is a four credit hour course which will substitute for Statistics 2101 (C021) and 2102 (0022) for Fox School students. Prior to fall 2014, the title of STAT 2903 was "Honors Business Statistics."

Course Attributes: HO

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of C- in (MATH 1022, STAT 1001, 'Y' in STA2, 'Y' in STT2, MATH 1021, or 'Y' in ST2A) and (STAT 1102, STAT 1902, MATH 1031, MATH 1041, MATH 1941, MATH 1038, 'Y' in STT3, or 'Y' in MATW)

STAT 3502. Regression and Predictive Analytics. 3 Credit Hours.
The course covers a variety of statistical methods useful in interdisciplinary research, such as simple and multiple regression analysis, ANOVA, analysis of covariance, logistic regression, and predictive models. Emphases are placed on rationales, assumptions, techniques, and interpretation of results from computer packages.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of C in (STAT 2103, STAT 2903, MATH 3031, STAT 2104, SOC 1167, CEE 3048, PSY 1167, PSY 2168, AS 2101, AS 2505, ECE 3522, SOC 0825, ANTH 0825, POLS 0825, PSY 0825, PSY 1003, 'Y' in CRST03, 'Y' in CRST06, 'Y' in CRMA16, 'Y' in CRSO02, 'Y' in CRCE01, 'Y' in CRAS02, 'Y' in CREE01, 'Y' in CRSO01, 'Y' in CRPO01, 'Y' in CRPS02, 'Y' in CRST08, or 'Y' in CRPS05) and (STAT 2521 or 'Y' in CRST05)

STAT 3503. Applied Statistics and Data Science. 3 Credit Hours.
The course will provide a sound treatment on core topics in applied statistics using modern data science techniques. Some basic theory will be reviewed, but the course will emphasize applications. R will be used as the main statistical software package for this course. Upon completing this course, students should be able to demonstrate the knowledge of fundamental concepts and properties in applied statistics such as multiple linear regression, hypothesis testing, model diagnostic and selection and the ability to select proper statistical tools and justify different needs.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of C (except where noted) in (MATH 1041 (C- or higher) or MATH 1941 (C- or higher)), (MATH 1042 (C- or higher) or MATH 1942 (C- or higher)), and (STAT 2103, STAT 2903, MATH 3031, STAT 2104, AS 2505, SOC 1167, CEE 3048, PSY 1167, PSY 2168, SOC 3201, ECE 3522, SOC 0825, ANTH 0825, POLS 0825, PSY 0825, PSY 1003, 'Y' in CRST03, 'Y' in CRST06, 'Y' in CRMA16, 'Y' in CRSO02, 'Y' in CRCE01, 'Y' in CRSO03, 'Y' in CREE01, 'Y' in CRSO01, 'Y' in CRPO01, 'Y' in CRPS02, 'Y' in CRST08, or 'Y' in CRPS05)

STAT 3504. Time Series and Forecasting Models. 3 Credit Hours.
This time series analysis and forecasting models course with interdisciplinary applications covers important univariate and multivariate time series methods, including ARIMA models, further forecasting methods (logistic regression, ARIMA), centered and training Moving Average (MA). Students will apply the body of theoretical knowledge to analyzing real-life data sets.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of C in (STAT 2103, STAT 2903, MATH 3031, STAT 2104, SOC 1167, CEE 3048, PSY 1003, PSY 2168, AS 2101, AS 2505, ECE 3522, SOC 0825, ANTH 0825, POLS 0825, PSY 0825, 'Y' in CRST03, 'Y' in CRST06, 'Y' in CRMA16, 'Y' in CRSO02, 'Y' in CRCE01, 'Y' in CRAS02, 'Y' in CREE01, 'Y' in CRSO01, 'Y' in CRPO01, or 'Y' in CRST08) and (STAT 2501 or 'Y' in CRST09)

STAT 3505. Introduction to SAS for Data Analytics. 3 Credit Hours.
This course is an introduction to programming for statistical analysis using the SAS Software System. Students will learn data set creation by data transformation to/from SAS using Import and Export functions. Concatenation, merging and subsetting data, as well as data restructuring and new variable construction using arrays and SAS functions will be taught. Simple procedures to clean and perform quality control of data, as well as procedures for calculating descriptive statistics, plots, and print outs will be covered. Laboratory exercises and homework assignments include brief exercises as well as manipulation and analysis of real data sets.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of C in (STAT 2103, STAT 2903, MATH 3031, STAT 2104, SOC 1167, CEE 3048, PSY 1167, PSY 2168, AS 2101, AS 2505, ECE 3522, SOC 0825, ANTH 0825, POLS 0825, PSY 0825, SOC 3201, PSY 1003, 'Y' in CRST03, 'Y' in CRST06, 'Y' in CRMA16, 'Y' in CRSO02, 'Y' in CRCE01, 'Y' in CRAS02, 'Y' in CREE01, 'Y' in CRSO01, 'Y' in CRPO01, 'Y' in CRSO03, 'Y' in CRPS02, 'Y' in CRST08, or 'Y' in CRPS05)

STAT 3506. Nonparametric and Categorical Data Analysis. 3 Credit Hours.
This course covers estimation and testing of hypotheses when the functional form of the population distribution is not completely specified. The topics also include sampling models and analyses for discrete data: Fisher's exact test, logistic regression, ROC analysis, log-linear models and Poisson regression, conditional logistic regression, Cochran-Mantel-Haenszel test, measures of agreement between observers, quasi-independence, multinomial logit models, proportional odds model, association models, generalized estimating equations (GEE). Students work with R and SAS throughout the semester.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of C in (STAT 2103, STAT 2903, MATH 3031, STAT 2104, SOC 1167, CEE 3048, PSY 1003, PSY 2168, AS 2101, AS 2505, ECE 3522, SOC 0825, ANTH 0825, POLS 0825, PSY 0825, 'Y' in CRST03, 'Y' in CRST06, 'Y' in CRMA16, 'Y' in CRSO02, 'Y' in CRCE01, 'Y' in CRAS02, 'Y' in CREE01, 'Y' in CRSO01, 'Y' in CRPO01, 'Y' in CRST08, or 'Y' in CRPS05) and (STAT 2501 or 'Y' in CRST09)

STAT 3507. Intermediate Statistics. 3 Credit Hours.
This course covers the basics of statistical estimation theory, in preparation for further study in regression, time series analysis, and forecasting (as tested on the SOA/CAS Course 4 professional examination). Topics include: classical point estimation methods; construction of confidence intervals; tests of statistical hypotheses; and basic analysis of categorical data.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of C- in (AS 2101, AS 2505, MATH 3031, STAT 2103, STAT 2903, or STAT 2104) and STAT 2501.

STAT 3508. Data Management, Missing Data, and Outlier Analysis. 3 Credit Hours.
Significant advances in technology have resulted in most organizations collecting enormous amounts of data both deliberately and incidentally in the course of doing business. Managing data on this scale and converting it into knowledge to facilitate decision making presents exciting new challenges. Although data is ubiquitous, real data is also often "dirty", corrupted with various forms of errors, or missing. Regardless of whether data is "clean", it may not be in the proper format for analysis, or data from multiple places may need to be merged in order for analysis to take place. Thus, the first step in generating good information from data is almost always to clean, process, and validate the data. The goal of this course is to explore tools and techniques for managing data, cleaning data (fixing errors, identifying outliers, etc.), extracting subsets or samples of data, merging and combining datasets, summarizing data, and dealing with the most common problems that may arise with data.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of C in (STAT 2103, STAT 2903, MATH 3031, STAT 2104, SOC 1167, CEE 3048, PSY 1167, PSY 2168, AS 2101, AS 2505, ECE 3522, SOC 0825, ANTH 0825, POLS 0825, PSY 0825, SOC 3201, PSY 1003, 'Y' in CRST03, 'Y' in CRST06, 'Y' in CRMA16, 'Y' in CRSO02, 'Y' in CRCE01, 'Y' in CRAS02, 'Y' in CREE01, 'Y' in CRSO01, 'Y' in CRPO01, 'Y' in CRSO03, 'Y' in CRPS02, 'Y' in CRST08, or 'Y' in CRPS05)

STAT 3580. Special Topics - Statistics. 3 Credit Hours.
Special topics in current developments in the field of statistics.

Repeatability: This course may be repeated for additional credit.

STAT 3582. Independent Study. 1 to 6 Credit Hour.
Readings, papers and/or laboratory work under supervision of a faculty member.

Repeatability: This course may be repeated for additional credit.

STAT 4596. Capstone: Statistical Science and Data Analytics. 3 Credit Hours.
The purpose of the capstone project is for the students to apply theoretical knowledge acquired during the program to a real project involving actual data in a realistic setting. During the project, students engage in the entire process of solving a real-world data science project: from collecting and processing actual data, to applying a suitable and appropriate analytic method to the problem. Both the problem statements for the project assignments and the datasets originate from real-world domains similar to those that students might typically encounter within industry, government, NGO, or academic research. The project will culminate with both an in-class presentation and final research paper.

Course Attributes: WI

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of C- (except where noted) in (STAT 2521 (C or higher) or 'Y' in CRST05) and (BA 2196 or BA 2996)