Statistics (STA)

Statistics (STA) Courses

STA 1053. Basic Statistics. (3-0) 3 Credit Hours. (TCCN = MATH 1342)
Prerequisite: Satisfactory performance on placement examination. Descriptive statistics; histograms; measures of location and dispersion; elementary probability theory; random variables; discrete and continuous distributions; interval estimation and hypothesis testing; simple linear regression and correlation; one-way analysis of variance, and applications of the chi-square distribution. May be applied toward the core curriculum requirement in Mathematics. Generally offered: Fall, Spring, Summer.

STA 1403. Probability and Statistics for the Biosciences. (3-0) 3 Credit Hours. (TCCN = MATH 2342)
Prerequisite: A grade of "C-" or better in MAT 1193 or an equivalent. Probability and statistics from a dynamical perspective, using discrete-time dynamical systems and differential equations to model fundamental stochastic processes such as Markov chains and the Poisson processes important in biomedical applications. Specific topics to be covered include probability theory, conditional probability, Markov chains, Poisson processes, random variables, descriptive statistics, covariance and correlations, the binomial distribution, parameter estimation, hypothesis testing and regression. (Formerly STA 1404. Credit cannot be earned for both STA 1403 and STA 1404.) Generally offered: Fall, Spring, Summer.

STA 2303. Applied Probability and Statistics for Engineers. (3-0) 3 Credit Hours.
Prerequisite: MAT 1224. Fundamental concepts of probability and statistics with practical applications to engineering problems. Emphasis on statistical distribution models used in reliability and risk analysis of engineering design; probabilistic reasoning; Bayes’ theorem; bivariate and multivariate distributions and their applications. Generally offered: Fall, Spring.

STA 3003. Applied Statistics. (3-0) 3 Credit Hours.
Prerequisite: Completion of or concurrent enrollment in MAT 1033, MAT 1093, MAT 1214, or an equivalent. Introduction to the Scientific Method; principles of sampling and experimentation; scales of measurement, exploratory data analysis; introduction to basic probability; models for discrete and continuous data; simple simulations and inferences based on resampling; fundamentals of hypothesis testing and confidence intervals; introduction to analysis of variance and linear regression model. The course will emphasize data analysis and interpretation and effective communication of results through reports or presentations. Generally offered: Fall, Spring, Summer.

STA 3013. Multivariate Analysis for the Life and Social Sciences. (3-0) 3 Credit Hours.
Prerequisite: STA 3003, STA 3513, or an equivalent. This course emphasizes application of statistics in organizations. Topics include, but are not limited to the multivariate normal distribution, tests on means, discriminant analysis, cluster analysis, principal components, and factor analysis. Use of software packages will be emphasized. Open to students of all disciplines. Generally offered: Spring.

STA 3313. Experiments and Sampling. (3-0) 3 Credit Hours.
Prerequisite: One of the following: MS 1023, STA 1053, STA 2303, STA 3003, or an equivalent. Research techniques for collecting quantitative data: sample surveys, designed experiments, simulations, and observational studies; development of survey and experimental protocols; measuring and controlling sources of measurement error. Generally offered: Fall.

STA 3513. Probability and Statistics. (3-0) 3 Credit Hours.
Prerequisites: STA 3003 and MAT 1224. Axiomatic probability; random variables; discrete and continuous distributions; bivariate and multivariate distributions and their applications; mixture distributions; moments and generating functions, bivariate transformations. Generally offered: Fall, Spring, Summer.

STA 3523. Mathematical Statistics. (3-0) 3 Credit Hours.
Prerequisite: STA 3513 or an equivalent. Sampling distributions and the Central Limit Theorem; order statistics; estimation including method of moments and maximum likelihood; properties of estimators; hypothesis testing including likelihood ratio tests; introduction to ANOVA and regression. Generally offered: Fall, Spring.

STA 3813. Discrete Data Analysis. (3-0) 3 Credit Hours.
Prerequisite: STA 3003 or STA 3513. Introduction to methods for analyzing discrete (categorical) data. Course emphasizes the uses and interpretations of the methods rather than the underlying theory. Topics include Two-way and Three-Way Contingency Tables, Partial Association, Cochran-Mantel-Haenszel Method, Generalized Linear models, Model Inference and Model Checking, Logistic Regression, Loglinear Models, and Models for Matched Pairs.

STA 4133. Introduction to Programming and Data Management in SAS. (3-0) 3 Credit Hours.
This course introduces essential programming concepts using SAS Enterprise Guide software, with a focus on data management and the preparation of data for statistical analyses. Topics include reading raw data, creating temporary and permanent datasets, manipulating datasets, data prompts, summarizing data, displaying data using tables, charts, and plots, and conducting basic statistical analyses. This course also demonstrates how to write, generate, and modify SAS code within SAS Enterprise Guide. Generally offered: Fall.

STA 4143. Data Mining. (3-0) 3 Credit Hours.
Prerequisite: STA 4133 or equivalent. Acquisition, organization, exploration, and interpretation of large data collections. Data cleaning, representation and dimensionality, multivariate visualization, clustering, classification, and association rule development. A variety of commercial and research software packages will be used.

STA 4233. Statistical Applications Using SAS Software. (3-0) 3 Credit Hours.
Prerequisites: STA 4133 or approval of instructor; and one of the following: MS 3313 or STA 3523. Analysis of datasets using the statistical software package SAS. Methods for analyzing continuous and categorical data will be introduced, using procedures from Base SAS, SAS/GRAPH and SAS/STAT software. Techniques for efficient programming will be stressed. Examples will be drawn from regression analysis, analysis of variance, categorical analysis, multivariate methods, simulation, and resampling. Generally offered: Spring.

STA 4643. Introduction to Stochastic Processes. (3-0) 3 Credit Hours.
Prerequisite: STA 3513. Probability models, Poisson processes, finite Markov chains, including transition probabilities, classification of states, limit theorems, queuing theory, and birth and death processes. Generally offered: Summer.
STA 4713. Applied Regression Analysis. (3-0) 3 Credit Hours.
Prerequisite: MS 3313 or STA 3003. An introduction to regression analysis, with emphasis on practical aspects, fitting a straight line, examination of residuals, matrix treatment of regression analysis, fitting and evaluation of general linear models, and nonlinear regression. Generally offered: Fall.

STA 4723. Introduction to the Design of Experiments. (3-0) 3 Credit Hours.
Prerequisite: MS 3313 or STA 3003. General concepts in the design and analysis of experiments. Emphasis will be placed on both the experimental designs and analysis and tests of the validity of assumptions. Topics covered include completely randomized designs, randomized block designs, complete factorials, fractional factorials, and covariance analysis. The use of computer software packages will be stressed.

STA 4753. Time-Series Analysis. (3-0) 3 Credit Hours.
Prerequisite: STA 3513 or an equivalent. Development of descriptive and predictive models for time-series phenomena. A variety of modeling approaches will be discussed: decomposition, moving averages, time-series regression, ARIMA, and forecasting errors and confidence intervals. Generally offered: Spring.

STA 4803. Statistical Quality Control. (3-0) 3 Credit Hours.
Prerequisite: STA 2303, STA 3003, STA 3513, or an equivalent. Statistical methods are introduced in terms of problems that arise in manufacturing and their applications to the control of manufacturing processes. Topics include control charts and acceptance sampling plans. (Same as MS 4363 and MAT 4803. Credit cannot be earned for more than one of the following: STA 4803, MS 4363, or MAT 4803).

STA 4903. Applied Survival Analysis. (3-0) 3 Credit Hours.
Prerequisite: STA 3523 or an equivalent. Measures of survival, hazard function, mean residual life function, common failure distributions, procedures for selecting an appropriate model, the proportional hazards model. Emphasis on application and data analysis using SAS.

STA 4911. Independent Study. (0-0) 1 Credit Hour.
Prerequisites: A 3.0 College of Business grade point average, permission in writing (form available) from the instructor, the student’s advisor, the Department Chair, and the Dean of the College in which the course is offered. Independent reading, research, discussion, and/or writing under the direction of a faculty member. May be repeated for credit, but not more than 6 semester credit hours, regardless of discipline, will apply to a bachelor’s degree.

STA 4913. Independent Study. (0-0) 3 Credit Hours.
Prerequisites: A 3.0 College of Business grade point average, permission in writing (form available) from the instructor, the student’s advisor, the Department Chair, and the Dean of the College in which the course is offered. Independent reading, research, discussion, and/or writing under the direction of a faculty member. May be repeated for credit, but not more than 6 semester credit hours, regardless of discipline, will apply to a bachelor’s degree.

STA 4933. Internship in Statistics. (0-0) 3 Credit Hours.
Prerequisites: Permission in writing from the instructor, the Department Chair, and the Dean of the College of Business; and a 2.5 UTSA grade point average. See academic advisor for required forms and additional requirements. Supervised full- or part-time work experience in statistics. Offers opportunities for applying statistics in private businesses or public agencies. May be repeated for credit, but not more than 6 semester credit hours will apply to a bachelor's degree.

STA 4953. Special Studies in Statistics. (3-0) 3 Credit Hours.
Prerequisites: Consent of instructor, Department Chair and Dean of the College. An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Studies may be repeated for credit when the topics vary, but not more than 6 semester credit hours, regardless of discipline, will apply to a bachelor’s degree.

STA 4961. Actuarial Science Examination Preparation. (1-0) 1 Credit Hour.
An organized course offering specialized study for Actuarial Science Examinations. Topics covered include General Probability, Random Variables and Probability Distributions, Multivariate Distributions, and Risk Management and Insurance. May be repeated twice for credit. Generally offered: Fall, Spring.

STA 4962. Actuarial Science Examination Preparation. (2-0) 2 Credit Hours.
An organized course offering specialized study for Actuarial Science Examinations. Topics covered include General Probability, Random Variables and Probability Distributions, Multivariate Distributions, and Risk Management and Insurance. Generally offered: Fall, Spring.

STA 4963. Actuarial Science Examination Preparation. (3-0) 3 Credit Hours.
An organized course offering specialized study for Actuarial Science Examinations. Topics covered include General Probability, Random Variables and Probability Distributions, Multivariate Distributions, and Risk Management and Insurance. Generally offered: Fall, Spring.

STA 4993. Honors Thesis. (0-0) 3 Credit Hours.
Prerequisites: STA 3523 and consent of instructor, Department Chair and Dean of the College. Enrollment limited to students applying for Honors in Management Science and Statistics. Supervised research and preparation of an honors thesis. May be repeated once for credit with advisor’s approval. Generally offered: Spring.