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; descriptive statistics;
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. Course Fees: BISP $10; BTSI $15; LRB1 $15; LRC1 $12.

STA 1403. Probability and Statistics for the Life and Social Sciences. (3-0) 3 Credit Hours.
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. Course Fees: BISP $10; BTSI $15; LRB1 $15.

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. Course Fees: BISP $10; BTSI $15; LRB1 $15.

STA 2304. Mathematical Statistics. (3-0) 3 Credit Hours.
Prerequisite: MAT 1224 or an equivalent. This course discusses and reviews the classic mathematical methods and techniques to comprehend the advanced statistical concepts. Concepts include sequences, series, convergence, limit, continuity, derivative, optimization, the fundamental theorem of calculus, methods of integration, Taylor expansions, function of several variables, partial derivatives, and multivariate transformations. Other topics include vector and matrix
algebra, determinants, inverse matrix, solving linear equations, orthogonal transformations (projections, least-squares, Gram-Schmidt), eigenvalues and eigenvectors (diagonalization, symmetric/positive definite matrices), and singular value decomposition. (Formerly titled Statistical Mathematics.) Course Fees: BISP $20; BTSI $15; LRB1 $21.

STA 3103. 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. Course Fees: BISP $20; BTSI $15; LRB1 $21.

STA 3313. Introduction to Data Science and Analytics. (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. Course Fees: BISP $20; BTSI $15; LRB1 $21.

STA 3333. Introduction to Data Science and Analytics. (3-0) 3 Credit Hours.
Prerequisite: One of the following: MS 1023, STA 1053, STA 1403, STA
2303, 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. Course Fees: BISP $20; BTSI $15; LRB1 $21.

STA 3333. Introduction to Data Science and Analytics. (3-0) 3 Credit Hours.
Prerequisite: One of the following: MS 1023, STA 1053, STA 1403, STA
2303, 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. Course Fees: BISP $20; BTSI $15; LRB1 $21.

STA 3313. Experiments and Sampling. (3-0) 3 Credit Hours.
Prerequisite: STA 3003, and either MAT 1224 or STA 3023.
Axiomatic probability; random variables; discrete and continuous
distributions; bivariate and multivariate distributions and their applications.
Generally offered: Fall, Spring, Summer. Course Fees: BISP $20; BTSI $15; LRB1 $21.

STA 3023. Mathematics for Statistics. (3-0) 3 Credit Hours.
Prerequisite: MAT 1224 or an equivalent. This course discusses and reviews the classic mathematical methods and techniques to comprehend the advanced statistical concepts. Concepts include sequences, series, convergence, limit, continuity, derivative, optimization, the fundamental theorem of calculus, methods of integration, Taylor expansions, function of several variables, partial derivatives, and multivariate transformations. Other topics include vector and matrix
algebra, determinants, inverse matrix, solving linear equations, orthogonal transformations (projections, least-squares, Gram-Schmidt), eigenvalues and eigenvectors (diagonalization, symmetric/positive definite matrices), and singular value decomposition. (Formerly titled Statistical Mathematics.) Course Fees: BISP $20; BTSI $15; LRB1 $21.
STA 4133. Introduction to Programming and Data Management in SAS. (3-0) 3 Credit Hours.
This course introduces essential programming concepts using the statistical software package SAS (Enterprise Guide and Base SAS) 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. Conducting basic statistical analyses using the SAS Enterprise Guide and the Base SAS procedures are also discussed with the examples selected from regression analysis, analysis of variance, and categorical analysis. This course also demonstrates how to write, generate, and modify SAS code and procedures within the SAS Enterprise Guide and the Base SAS environments. Generally offered: Fall. Course Fees: BISP $20; BTSI $15; LRB1 $21.

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. Course Fees: BISP $20; BTSI $15; LRB1 $21.

STA 4233. Introduction to Programming and Data Management in R. (3-0) 3 Credit Hours.
This course introduces statistical computing and programming using the R language. Topics include preprocessing/manipulating datasets, summarizing/visualizing data, and conducting basic statistical analyses using R. Other topics include writing R functions, object oriented programming, statistical simulation and resampling, interfacing R with other programming language environments such as SQL, Python, C++, and Hadoop. Techniques for efficient programming will be stressed. The concept of high-performance computing (multi-core/parallel-processing) is also demonstrated. (Formerly titled Statistical Applications Using SAS Software.) Generally offered: Spring. Course Fees: BISP $20; BTSI $15; LRB1 $21.

STA 4643. Introduction to Stochastic Processes. (3-0) 3 Credit Hours.

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. Course Fees: BISP $20; BTSI $15; LRB1 $21.

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. Course Fees: BISP $20; BTSI $15; LRB1 $21.

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. Course Fees: BISP $20; BTSI $15; LRB1 $21.

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.) Course Fees: BISP $20; BTSI $15; LRB1 $21.

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. Course Fees: BISP $20; BTSI $15; LRB1 $21.

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. Course Fees: BISP $20; BTSI $15.

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. Course Fees: BISP $20; BTSI $15.

STA 4933. Internship in Statistics. (0-0) 3 Credit Hours.
Prerequisites: A 2.5 grade UTSA point average, and approval in writing from the instructor, the student’s advisor, the Department Chair, and the Associate/Assistant Dean of Undergraduate Studies in the College of Business. 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. A written report is required. May be repeated for credit, but not more than 6 semester credit hours will apply to a bachelor’s degree. Course Fees: BISP $20; BTSI $15.

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. Course Fees: BISP $20; BTSI $15; LRB1 $21.
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. Course Fees: BISP $20; BTSI $15; LRB1 $21.

STA 4962. Actuarial Science Examination Preparation. (2-0) 2 Credit Hours.

STA 4963. Actuarial Science Examination Preparation. (3-0) 3 Credit Hours.

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. Course Fees: BISP $20; BTSI $15.