

# STATISTICS (STAT)

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## **STAT 5331** Statistical Computing **3 SCH (3)**

Provides the computer tools for modern research analysis. Introduction to use of computer and statistical software. Includes applications of SAS to data entry, experimental design, regression, surveys. Prerequisite: one statistics course or equivalent. Laboratory fee, \$5.

## **STAT 5332** Big Data and Computing **3 SCH (3)**

Introduction to use of SAS (and R)/PC statistical software, including data entry, data summaries, descriptive statistics, and interpretation of SAS (and R) output for some standard statistical procedures. Prerequisite: STAT 5344 or equivalent.

## **STAT 5343** Applied Regression Analysis **3 SCH (3)**

Multiple regression analysis, selecting the "best" regression equation, general model building, introductory linear models. Prerequisite: an advanced statistics course. Laboratory fee, \$5.

## **STAT 5344** Predictive Analytics **3 SCH (3)**

Correlation, simple linear and multiple regression, one and two way ANOVA, various multiple comparison procedures, randomized block designs, applications, use of statistical software. Prerequisite: STAT 4301 or STAT 4303 or equivalent.

## **STAT 5345** Analysis of Research Data **3 SCH (3)**

Basic concepts and techniques for research including completely randomized design, factorial, randomized complete block, split-plot, Latin square and analysis of variance. Prerequisite: one statistics course. Laboratory fee, \$5.

## **STAT 5346** Design of Experiments **3 SCH (3)**

Hypothesis testing, principles of design of an experiment, t-test, completely randomized design, randomized block design, multiple comparison techniques, factorial designs, random effect models, fixed effect models, BIBD, nested designs, analysis of covariance and split plot design. Prerequisite: STAT 4301 or STAT 4303 or equivalent.

## **STAT 5350** Probability for Analytics **3 SCH (3)**

Mathematical treatment of probability distributions, probability concepts and laws; sample spaces, combinations and permutations, Bayes' theorem, discrete/continuous random variables, expected value, distribution of functions of random variable, two-dimensional variables, central limit theorem; t, F, and chi-square distributions. Prerequisite: STAT 4301 or STAT 4303 or equivalent.

## **STAT 5351** Inferential Analytics **3 SCH (3)**

Theory of estimation and hypothesis testing, maximum likelihood, method of moments, likelihood ratio tests, consistency, bias, efficiency and sufficiency. Prerequisite: STAT 5350 (requested) or equivalent.

## **STAT 5361** Multivariate Statistics **3 SCH (3)**

An applied approach to multivariate data analysis and linear statistical models in research. Prerequisite: MATH 4341 and STAT 5344 [Requested] or equivalents.

## **STAT 5362** Nonparametric Statistics **3 SCH (3)**

Estimation and hypothesis testing, models for categorical data, classical rank-based nonparametric methods, permutation tests, bootstraps methods, and curve smoothing. Prerequisite: STAT 4301 or STAT 4303 or equivalent.

## **STAT 5370** Survey Sampling Analytics **3 SCH (3)**

Survey sampling from initial planning phases through collection and storage of the data; simple random sampling, stratified random sampling, auxiliary information, estimators, chi-square contingency table analysis for two and three way tables, handling of small expected frequencies, matched pairs, measures of association; use of statistical software on big survey data. Prerequisite: STAT 4301 or STAT 4303 or equivalent.

## **STAT 5372** Model Assisted Survey Methods **3 SCH (3)**

Probability proportional to size sampling, auxiliary information, Horvitz and Thompson estimator, calibration of design weights, model assisted calibration techniques, GREG and linear regression estimator, imputation of missing data, bootstrap and jackknifing. Prerequisite: STAT 5370 [requested] or equivalent.

## **STAT 5374** Survey Models Social Science **3 SCH (3)**

Sensitive data and privacy issues in survey sampling. Randomized response models and variations. Estimation of prevalence of two or more sensitive characteristics. Use of Cramer-Rao lower bound of variance. Measures of protection of respondents. Models using complex designs. Prerequisite: STAT 4301, STAT 4303, or PSYC/SOCI 3381 or equivalent.

## **STAT 5375** Operations Research **3 SCH (3)**

Geometric linear programming, the Simplex method, duality theory, sensitivity analysis, project planning and integer programming. Optional topics include, but are not limited to: the transportation problem, the upper bounding technique, the dual Simplex method, parametric linear programming, queuing theory, decision analysis, and simulation. Prerequisite: Any introductory course in linear algebra.

## **STAT 5380** Survival Analysis **3 SCH (3)**

Statistical analysis of time-to-event or survival data. Basic Terminology and both parametric and non-parametric techniques. Continuous and discrete time regression models and partial likelihood estimation. Includes competing risk models, unobserved heterogeneity, and multivariate survival models including event history. Prerequisite: STAT 5350 and STAT 5351 or equivalents.

## **STAT 5390** Advanced Topic in Statistics **3 SCH (3)**

Different areas of advanced statistics will be covered at separate offerings of this course. Topics include sampling techniques, multivariate analysis, quality control techniques. May be repeated once. Prerequisite: 6 semester hours of advanced statistics or the equivalent. Laboratory fee, \$5.

Fee: \$5.00