

# STAT: STATISTICS (STAT)

## **STAT 510. Stat Procedures In Ed & PSYC. (3 Credits)**

This is a general terminal course designed primarily for graduate students enrolled in professional education research, psychology, guidance, or other behavior sciences. It is defined as an applications approach to methodology of modern research. This course will help prepare individuals to comprehend, interpret, and report statistical results for use in educational research, thesis presentation, and publication in research journals. Elementary and advanced statistical methods will be discussed. Statistical software will be used to analyze and interpret large databases occurring in real life situations.

## **STAT 511. Biometry. (3 Credits)**

The main techniques of statistical analysis as applied in the biological sciences are discussed. This course is of interest to students in social sciences as well. Probability, Binomial, Poisson and normal distributions, estimation and hypothesis testing, Analysis of variance, regression and analysis of covariance. Prerequisite: STAT 480 or equivalent.

## **STAT 520. Advanced Stat Methods Ed Resea. (3 Credits)**

Only for students in Mathematics Education or Science Education. Descriptive statistics, normal, binomial, t, Chi-square and F distributions. Estimation and hypothesis testing, Parametric and nonparametric tests: z-test, t-test, one-way and two-way analysis of variance, analysis of covariance, chi-square tests of goodness-of-fit and independence for categorical data, linear correlation and regression, multiple regression. Statistical results from mathematics education research journals will be studied and real data from educational sources will be analyzed using statistical software. Prerequisite: STAT 330 or equivalent.

## **STAT 521. Statistics for Teachers. (3 Credits)**

Exploring data, planning a study, anticipating patterns and statistical inference. Course is designed to make connections between statistics topics and the teaching of statistics in elementary, middle and high school. This course does not satisfy the requirements of STAT 520.

## **STAT 562. Mathematical Statistics IV. (3 Credits)**

Univariate and multivariate distribution theory; moment generating function; inequalities in statistics; order statistics; estimation theory; likelihood; sufficiency; efficiency; maximum likelihood; testing hypotheses; likelihood ratio; confidence and prediction interval; Bayesian estimation and testing; basic decision theory. Prerequisites: MATH 261, STAT 480 or equivalent.

## **STAT 565. Nonparametric Statistics II. (3 Credits)**

Rank correlations, linear and monotonic regression, several related samples, balanced incomplete block design, randomization, rank transformation and goodness-of-fit tests. Prerequisite: STAT 481 or equivalent.

## **STAT 568. Design of Experiments. (3 Credits)**

General linear model; fixed, random and mixed effects models; randomized block, incomplete block and Latin square designs; factorial designs; analysis of covariance. Prerequisite: STAT 480 or equivalent.

## **STAT 570. Stochastic Processes. (3 Credits)**

Random walks; Markov chains; Poisson processes; Wiener processes; queuing and inventory analysis; reliability theory. Prerequisites: STAT 480, STAT 490 or equivalent.

## **STAT 572. Categorical Data Analysis. (3 Credits)**

Two-way and three-way contingency tables; measures of association; log-linear, logit and hierarchical models; inferences based on multinomial, Poisson and Chi-Square distributions and residual analysis. Prerequisite: STAT 480 or equivalent.

## **STAT 575. Regression Analysis. (3 Credits)**

Linear and multiple regression; analysis of residuals; variable and model selection including stepwise regression; transformations, weighting and diagnostics to correct model inadequacies. Prerequisite: STAT 480 or equivalent.

## **STAT 578. Multivariate Analysis. (3 Credits)**

Statistical theory associated with multivariate normal distribution; Wishart and related distributions; partial and multiple correlations; Hotelling's statistic; multivariate linear models; classification and discriminant analysis; principal components. Prerequisites: MATH 325, STAT 480 or equivalent.

## **STAT 583. Sampling Theory II. (3 Credits)**

Estimation, relative precision, optimum allocation and stratum sizes in stratified random sampling; quota sampling; ratio and regression estimates; systematic and cluster sampling. Prerequisite: STAT 382 or equivalent.

## **STAT 599. Research and Thesis. (3 Credits)**

General linear model; fixed, random and mixed effects models; randomized block, incomplete block and Latin square designs; factorial designs; analysis of covariance. Prerequisites: Instructor's or graduate program coordinator permission.

## **STAT 601. Introduction to Predictive Ana. (3 Credits)**

This course focuses on building computational abilities, inferential thinking, and practical skills for tackling core data scientific challenges, and covers predictive modeling methods, approaches and tools.

## **STAT 610. Bayesian Statistics. (3 Credits)**

This class introduces the Bayesian approach to statistics. The course compares the Bayesian approach to the more commonly-taught Frequentist approach.