

# Bachelor of Science in Statistics

## Course Descriptions

**Stat 114. DESCRIPTIVE STATISTICS.** Statistics; statistical measurement; statistical notations; collection, organization and presentation of data; measures of central tendency, location, dispersion, skewness, kurtosis; letter values, boxplots and stem-and-leaf display; measures of association and relationship; rates, ratios, and proportions; construction of index numbers and indicators. Coreq: Math 17/equiv. 3 u.

**Stat 115. BASIC STATISTICAL METHODS.** Computer assisted statistical analysis on the following: tests for means; tests for proportions; tests for independence; simple linear regression; Analysis of variance; forecasting using classical techniques. Prereq: Stat 114/101/equiv. 3 u.

**Stat 117. MATHEMATICS FOR STATISTICS.** Principles of logic; methods of proof; fields, sigma fields, and sequences of sets; the real number system; sequences & series; combinatorial analysis. Prereq: Math 17/equiv. 3 u.

**Stat 121. PROBABILITY THEORY I.** Elements of probability; random variables; discrete and continuous random variables; probability distributions; special distributions; mathematical expectations; functions of a random variable. Prereq: Math 53, Stat 117/equiv; Coreq: Math 54. 3 u.

**Stat 122. PROBABILITY THEORY II.** Joint, marginal and conditional distributions; independence of several random variables; distributions and expectations of functions of random variables; characterization of F, t, and chi-square distributions; limit theorems. Prereq: Stat 121. 3 u.

**Stat 124. INTRODUCTION TO PROGRAMMING.** Introduction to microcomputer and operating systems; principles of programming; programming using a high-level computer language (e.g., PASCAL). Prereq: Stat 114/101/equiv. 3 u.

**Stat 125. APPLICATIONS SOFTWARE & SOFTWARE PACKAGES.** Use of statistical software packages (e.g., SAS, SPSS) for database management & basic statistical analysis. Prereq: Stat 115/ 101/equiv, Stat 124/equiv. 3 u.

**Stat 131. PARAMETRIC STATISTICAL INFERENCE.** Population and sample; statistics and sampling distributions; point and interval estimation; statistical hypothesis testing; inference based on the normal distribution and applications of z, t,  $\chi^2$ , and F distribution. Prereq: Stat 122, Math 55. 4 u (3 lec, 1 lab).

**Stat 132. NONPARAMETRIC STATISTICAL INFERENCE.** Levels of measurement; goodness of fit tests; sign and signed rank tests; distribution tests; association tests; tests for independence. Prereq: Stat 131, Stat 125. 3 u.

**Stat 133. BAYESIAN STATISTICAL INFERENCE.** Elements of Bayesian probability inference; assessment of prior likelihood and posterior distributions; Bayesian estimation and hypothesis testing; predictive distribution and asymptotics; Bayesian Hierarchical Models; introduction to Empirical Bayes; use of statistical software. Prereq: Stat 131, Stat 124. 3 u.

**Stat 134. INTRODUCTION TO SCIENTIFIC WRITING IN STATISTICS.** Principles and methods in scientific writing in Statistical studies. Prereq: Stat 122. 3 u.

**Stat 135. MATRIX THEORY FOR STATISTICS.** Matrix operations; properties of matrices; special matrices; matrix calculus; determinants; eigenvalues and eigenvectors; linear systems; vector spaces; use of software applications. Prereq: Math 53, Stat 125. 3 u.

**Stat 136. INTRODUCTION TO REGRESSION ANALYSIS.** Linear regression model; model selection; regression diagnostics; use of dummy variables; remedial measures. Prereq: Stat 131, Stat 135. 3 u.

**Stat 138. INTRODUCTION TO SAMPLING DESIGNS.** Probability and non-probability sampling; simple random, systematic, cluster, stratified and multi-stage sampling designs; sampling with probability proportional to size; applications. Prereq: Stat 131, Stat 125. 3 u.

**Stat 142. INTRODUCTION TO COMPUTATIONAL STATISTICS.** Contemporary themes in computational statistics; survey of computationally-intensive methods in statistics; advanced data management; SQL programming; resampling methods; simulations; macro programming; modelling applications. Prereq: Stat 136. 3 u.

**Stat 143. SURVEY OPERATIONS.** Research process; techniques of data collection; principles of questionnaire design; data coding and encoding; data quality control; presentation of research findings. Prereq: courses on technical writing & oral communication, Senior standing. 3u.

**Stat 145. INTRODUCTION TO TIME SERIES ANALYSIS & FORECASTING.** Classical methods; ARIMA models; Box-Jenkins method; intervention analysis; GARCH Models; regression with time series data; applications. Prereq: Stat 136. 3 u.

**Stat 146. INTRODUCTION TO EXPLORATORY DATA ANALYSIS.** Displaying and summarizing batches; re-expressing .data; median polish; robust and resistant measures; fitting resistant lines. Coreq: Stat 136. 3 u.

**Stat 147. INTRODUCTION TO MULTIVARIATE ANALYSIS.** Multivariate normal distribution; inference on mean vector and dispersion matrices; principal component analysis; canonical correlation analysis; discriminant analysis; factor analysis; cluster analysis; other multivariate techniques; applications. Prereq: Stat 136. 3 u.

**Stat 148. INTRODUCTION TO EXPERIMENTAL DESIGNS.** Principles of experimentation; completely randomized design; randomized complete block design; Latin-square design; factorial experiments; other experimental designs; applications. Prereq: Stat 136. 3 u.

**Stat 149. INTRODUCTION TO CATEGORICAL DATA ANALYSIS.** Categorical data; cross-classification tables; analysis using loglinear, logistic and logit models. Prereq: Stat 136. 3 u.

**Stat 191. SPECIAL TOPICS IN BIOLOGICAL AND MEDICAL STATISTICS.** Prereq: COI. 3 u.

**Stat 191.1 INTRODUCTION TO BIostatISTICS.** Prereq: Stat 125. Coreq: Stat 148

**Stat 192.1 STATISTICS IN MARKET RESEARCH.** Coreq: Stat 147. 3 u.

**Stat 192.2 ADVANCE LINEAR MODELS.** Prereq: Stat 136. 3 u.

**Stat 193. SPECIAL TOPICS IN INDUSTRIAL AND PHYSICAL SCIENCE STATISTICS.** Prereq: COI. 3 u.

**Stat 193.1 INTRO STATISTICAL QUALITY CONTROL.** Prereq: Stat 125, Stat 131

**Stat 194. SPECIAL TOPICS IN SOCIAL AND PSYCHOLOGICAL STATISTICS.** Prereq: COI. 3 u.

**Stat 196.1 ADVANCED STATISTICAL COMPUTING.** Prereq: Stat 136. 3 u.

**Stat 197. SPECIAL TOPICS IN STATISTICS.** Prereq: COI. 3 u.