

Discipline: Statistics

Offered through the Department of Mathematical Sciences, SSB 154, 786-1744/786-4824

STAT A252 **Elementary Statistics** **3 credits/(3+0)**

Prerequisites: Math 105 with minimum grade of C.

Registration Restrictions: If prerequisite is not satisfied, appropriate SAT, ACT or AP scores or approved UAA Placement Test required.

Course Attributes: GER Tier I Quantitative Skills.

Fees

Special Note: A student may apply no more than 3 credits from STAT 252 or BA 273 toward the graduation requirements for a baccalaureate degree.

Course Description: Introduction to statistical reasoning. Emphasis on concepts rather than in-depth coverage of traditional statistical methods. Topics include sampling and experimentation, descriptive statistics, probability, binomial and normal distributions, estimation, single-sample and two-sample hypothesis tests. Additional topics will be selected from descriptive methods in regression and correlation, or contingency table analysis.

STAT A253 **Applied Statistics for the Sciences** **4 credits/(4+0)**

Prerequisite: Math A107 or Math A109

Registration Restrictions: If prerequisite is not satisfied, appropriate SAT, ACT or AP scores or approved UAA Placement Test required.

Course Attributes: GER Tier I Quantitative Skills.

Fees.

Course Description: Intensive survey course with applications for the sciences. Topics include descriptive statistics, probability, random variables, binomial, Poisson and normal distributions, estimation and hypothesis testing of common parameters, analysis of variance for single factor and two factors, correlation, and simple linear regression. A major statistical software package will be utilized.

STAT A307 **Probability** **3 credits/(3+0)**

Prerequisites: Math A200 with minimum grade of C or Math A272 with minimum grade of C.

Course Attributes: GER Tier I Quantitative Skills.

Course Description: Probability, applied combinatorics, random variables, multivariate random variables, discrete distributions, continuous distributions, expectations, and estimation.

STAT A308 **Intermediate Statistics** **3 credits/(3+0)**

Prerequisite: STAT A252 or STAT A253 or STAT A307

Registration Restrictions: 100-level Natural Sciences course and a 100-level Social Sciences course and Junior standing and completion of GER Tier 1 (basic college-level skills) courses.

Course Attributes: GER Capstone course.

Fees.

Course Description: Introduction to statistical experimentation and research methods. General concepts of estimation, and inferences based on single sample and two samples. Systematic coverage of the more widely used statistical methods, including simple and multiple regression, correlation, single factor and multifactor analysis of variance, multiple comparisons, goodness of fit tests, contingency tables, nonparametric procedures, and power of tests. At least one major statistical software package is introduced to aid calculations required for many of the techniques. Students are expected to make a presentation in an applied field, and complete a data-based project as part of the course requirement.

STAT A402 **Scientific Sampling** **3 credits/(3+0)**

Prerequisite: STAT A252 or STAT A253 or STAT A307

Fees.

Course Description: Sampling methods, including simple random, stratified, systematic, and cluster. Special emphasis is placed on estimation procedures including ratio and regression methods, and topics selected from: allocations, direct sampling, inverse sampling, randomized response sampling, computer simulation of random variates, bootstrap, jackknife, and cross validation.

STAT A403 **Regression Analysis** **3 credits/(3+0)**

Prerequisite: STAT A308

Fees.

Course Description: Simple and multiple regression, statistical inferences in regression, matrix formulation of regression, polynomial regression, ridge regression, nonlinear regression, and normal correlation models. A major statistical package is used as a tool to aid calculations required for many of the techniques.

STAT A404 **Analysis of Variance** **3 credits/(3+0)**

Prerequisite: STAT A308

Fees.

Course Description: Single-factor models, factor effects, nonparametric tests, two-factor models, random and mixed effects models, multifactor studies, analysis of covariance, and selected experimental designs. A major statistical package is used as a tool to aid calculations required for many of the techniques.

STAT A405 **Nonparametric Statistics** **3 credits/(3+0)**

Prerequisite: STAT A308

Fees.

Course Description: Nonparametric methods including the binomial test and sign test. Contingency tables with Chi-square tests and goodness-of-fit tests. Tests based on ranks including the Wilcoxon signed ranks test, Mann-Whitney U-test, Kruskal-Wallis test, Friedman test, and rank

MATHEMATICAL STATISTICS COURSES

MATH A371 **Stochastic Processes** **3 credits/(3+0)**

Prerequisites: MATH A201 and STAT A307

Course Description: Theory and applications, including moment generating functions, conditional expectation, Poisson processes, Markov chains, and topics selected from branching processes, queuing theory, random walks, and reliability theory.

MATH A407 **Mathematical Statistics I** **3 credits/(3+0)**

Prerequisites: MATH A202 and STAT A307

Course Description: Topics include random variables, distribution functions, expectation and moment generating function, special parametric families of univariate distributions, joint and conditional distributions, stochastic independence, conditional expectation, distributions of functions of random variables, convergence concepts, and parametric estimation by maximum likelihood.

MATH A408 **Mathematical Statistics II** **3 credits/(3+0)**

Prerequisites: MATH A407

Course Description: Topics include sampling distributions, order statistics, point estimation, maximum likelihood estimators, consistency, unbiasedness, mean square error, Cramer-Rao lower bound, asymptotics of statistics, sufficient statistics, uniformly minimum variance and unbiased (UMVU) estimators, confidence intervals and hypotheses testing, lemma of Neyman-Pearson, and statistical decision theory.

07/15/06