

STATISTICS (STA)

STA 215. Introduction to Statistical Reasoning. (3 Credits)

I, II. Prerequisite: Satisfaction of English and reading academic readiness indicators and either satisfaction of mathematics academic readiness indicators* or concurrent enrollment in STA 215P. Introduction to descriptive statistics, normal distributions, correlation and linear regression, sampling, experiments, chance phenomena, one- and two-sample estimation and hypothesis testing, chi-square tests, and use of statistical software. Gen. Ed. E-2 [QR].

STA 215L. StatLab for STA 215. (1 Credit)

A. Corequisite: STA 215. This optional lab is to accompany a regular lecture class in STA 215; topics will vary. 2 Lab.

STA 215P. Quantitative Support for STA 215. (1 Credit)

(1) I, II. Corequisite: STA 215. Corequisite support for students concurrently enrolled in STA 215. Emphasis on prerequisite skills needed for statistics, such as real number sense and operations, equations, analyzing graphs, modeling, critical thinking, and use of statistical software. 2 Lab.

STA 230. Probability and Statistics for Middle Grades Teachers. (3 Credits)

Prerequisite: MAT 112, 114, 211, or 234 with a minimum grade of "C". Pre- or Co-requisite: MAE 201. Sampling graphs, percentiles, measures of center and variability, mean absolute deviation, correlation, lines of best fit, probability, geometric probability, independence, simulations, contingency tables, counting, binomial uniform, and normal probability distributions, one-sample inference, manipulatives, presentations, technology.

STA 260. Business Statistics. (3 Credits)

A. Descriptive statistics, probability, discrete and continuous distributions, normal distributions, sampling distributions, one- and two-sample estimation and hypothesis testing, correlation, linear regression, analysis of variance, business applications, and use of Excel.

STA 270. Applied Statistics. (4 Credits)

I, II. Prerequisite: MAT 112 or 112B higher with a minimum grade of "C", or a Math SAT score of 23 or higher, or a Math SAT math score of 560 or higher. Descriptive statistics, probability, counting techniques, discrete and continuous distributions, binomial distributions, normal distributions, sampling distributions, one- and two-sample estimation and hypothesis testing, chi-square tests, correlation, linear regression, analysis of variance, and use of statistical software. Gen. Ed. E-2 [QR].

STA 270L. StatLab for STA 270:____. (1 Credit)

A. Prerequisite/Corequisite: STA 270. This optional lab is to accompany a regular lecture class in STA 270; topics will vary. 2 Lab.

STA 340. Applied Regression Analysis. (3 Credits)

I, II. Prerequisite: STA 270 with a minimum grade of "C"; or STA 215 with a minimum grade of "B" and one of the following: MAT 112 or 112B or higher with a Grade of "C" a Math ACT score of 23 or higher, or a Math SAT score of 560 or higher; or departmental approval. Simple and multiple regression, model building, variable screening methods, detection and management of multicollinearity, residual analysis, logistic regression, classical time series analysis, and use of statistical software. Credit will not be awarded to students who have credit for STA 320.

STA 349. Applied Learning in Statistics. (0.5-8 Credits)

I, II; (1-6) SUMMER ONLY. Prerequisite: departmental approval. Work in placements related to academic studies. Does not apply to major or minor requirements. Total hours: eight, associate; sixteen, baccalaureate. A minimum of 80 hours of employment is required for each semester hour of academic credit.

STA 349A. Cooperative Study: Statistics. (0.5-8 Credits)

I, II. (1-6) SUMMER ONLY. Prerequisite: departmental approval. Work in placements related to academic studies. Does not apply to major or minor requirements. Total hours: eight, associate; sixteen, baccalaureate. A minimum of 80 hours of employment is required for each semester hour of academic credit.

STA 349B. Cooperative Study: Statistics. (0.5-8 Credits)

Work in placements related to academic studies. Does not apply to major or minor requirements.

STA 349C. Cooperative Study: Statistics. (0.5-8 Credits)

Work in placements related to academic studies. Does not apply to major or minor requirements.

STA 349D. Cooperative Study: Statistics. (0.5-8 Credits)

Work in placements related to academic studies. Does not apply to major or minor requirements.

STA 349E. Cooperative Study: Statistics. (0.5-8 Credits)

Work in placements related to academic studies. Does not apply to major or minor requirements.

STA 375. Sampling Methods. (3 Credits)

A. Prerequisite: STA 270 with a minimum grade of "C"; or STA 215 with a minimum grade of "B", and one of the following: MAT 112 or 112B or higher with a minimum grade of "C" or a Math ACT score of 23 or higher, or a score of 560 or higher; or departmental approval. Basic concepts of sampling theory, simple random sampling, stratified random sampling, cluster sampling, systematic sampling, ratio and regression estimation, applications to surveys, and use of statistical software. Written and/or oral presentations required.

STA 380. Nonparametric Statistics. (3 Credits)

Prerequisite: STA 270 with a minimum grade of "C"; or STA 215 with a minimum grade of "B" and one of the following: MAT 112 or 112B or higher with a Grade of "C" a Math ACT score of 23 or higher, or a Math SAT score of 560 or higher; or departmental approval. Simple, efficient nonparametric methods without normality assumptions. Tests, estimation of proportions, medians, two-sample location/dispersion, one and two-way layout, independence, regression, and use of statistical software. Credit will not be awarded to students who have credit for STA 501.

STA 382. Probability for Actuaries. (1 Credit)

A. Prerequisite: STA 370 or 520. Review of elementary probability theory, univariate and multivariate probability distributions, moment generating functions, transformations, order statistics, and applications of probability concepts in a risk management context. Preparation for Exam P.

STA 470. Applied Probability. (3 Credits)

Formerly STA 370. Prerequisites: Mat 244 of 244H or 254 or 254H; and STA 215 or 270; or departmental approval. Intuitive and axiomatic development of probability, set theory, counting techniques, conditional probability, Bayes Theorem, discrete distributions including univariate and bivariate cases, multinomial distributions, Markov Chains, and emphasis on applications. Credit will not be awarded to students who have credit for STA 370.

STA 480. Seminar in ____. (1-3 Credits)

A. Prerequisite: departmental approval. Topic announced at the time of offering. May be retaken to a maximum of 12 hours, provided the topics are different.

STA 485. Probability for Actuaries. (2 Credits)

A. Formerly STA 385. Prerequisite: STA 470, MAT 520 or STA 520. Review of elementary probability theory, univariate and multivariate probability distributions, moment generating functions, transformations, order statistics, and applications of probability concepts in a risk management context. Preparation for Actuarial Exam P. Credit will not be awarded to students who have credit for STA 385.

STA 495. Independent Work. (1-3 Credits)

A. Prerequisite: departmental approval. Directed study/ research on a problem or area chosen in consultation with instructor. Final paper required. Student must have the independent study proposal form approved by faculty supervisor and department chair prior to enrollment. May be retaken to a maximum of six hours.

STA 498. Statistics Capstone. (3 Credits)

A. Prerequisite or corequisite: MAT 520 (C) or STA 520 (C), senior standing, Statistics majors only. Careers in statistics, advanced topics in statistics, statistical research, statistical consulting, written and verbal communication skills, use of presentation software, and use of statistical software. Credit will not be awarded to students who have credit for STA 498W.

STA 498W. Statistics Capstone. (3 Credits)

A. Prerequisite or corequisite: MAT 520 (C) or STA 520 (C), senior standing, Statistics majors only. Careers in statistics, advanced topics in statistics, statistical research, statistical consulting, written and verbal communication skills, use of presentation software, and use of statistical software. Credit will not be awarded to students who have credit for STA 498.

STA 507. Seminar in Statistics:____. (1-3 Credits)

A. Prerequisite: departmental approval. Topics vary with offering. May be retaken with advisor approval, provided that the topics are different. Credit toward degree requirements will depend on the course content.

STA 520. Mathematical Statistics I. (3 Credits)

I. Cross-listed as MAT 520. Prerequisites: STA 215 or 270. Prerequisite or Corequisite: MAT 254 or 254H. Descriptive statistics, discrete and continuous probability distributions for one and two variables, functions of random variables, sampling distributions, expectations and generating functions. Credit will not be awarded to students who have credit for MAT 520.

STA 521. Mathematical Statistics II. (3 Credits)

II. Prerequisites: MAT 239; MAT 520 or STA 520. A continuation of STA 520. Estimation theory, hypothesis testing, linear regression analysis of variance, and allied topics.

STA 570. Quality Control & Reliability. (3 Credits)

(3) A. Prerequisites: Senior standing, MAT 234 or 234H, and STA 340. Analysis of six sigma techniques, statistical analysis of process capability, statistical process control using control charts, quality improvement, acceptance sampling, and an introduction to product reliability.

STA 575. Statistical Methods Using SAS. (3 Credits)

A. Prerequisite: STA 270 with a minimum grade of "C"; or STA 215 with a minimum grade of "B", and one of the following: MAT 112 or 112B or higher with a minimum grade of "C" or a Math ACT score of 23 or higher, or a Math SAT score of 560 or higher; or departmental approval. Data set manipulation, application of statistical techniques in SAS, and statistical programming.

STA 580. R and Introductory Data Mining. (3 Credits)

A. Cross-listed as DSC 580. Prerequisite: STA 270 with a minimum grade of "C", or 215 with a minimum grade of "B", and CSC 170 or 174 or 189 or 190. Data set manipulation, application of statistical techniques in R, statistical programming, and data mining skills. Credit will not be awarded to students who have credit for DSC 580.

STA 585. Experimental Design. (3 Credits)

A. Prerequisites: STA 270 or departmental approval. Completely randomized designs, factorial experiments, multiple comparisons, model diagnostics, randomized blocks, latin squares, fixed and random models, nested-factorial experiments, 2^f factorial experiments, and split-plot designs. Emphasis on applications and use of statistical software.

STA 707. Seminar in Statistics:____. (1-3 Credits)

A. Topics vary with offering. May be retaken with advisor approval, provided the topics are different. Credit towards degree requirements will depend on the course content.

STA 720. Mathematical Statistics I. (3 Credits)

A. Cross-listed as MAT 720. Descriptive statistics, discrete and continuous probability distributions for one and two variables, functions of random variables, sampling distributions, expectations and generating functions. Credit will not be awarded to students who have credit for MAT 720. It is strongly recommended that students have completed eight hours of calculus.

STA 721. Mathematical Statistics II. (3 Credits)

heA. Prerequisite: MAT 520, 720, STA 520 or STA 720. A continuation of STA 720. Estimation theory, hypothesis testing, linear regression, analysis of variance, and allied topics. It is strongly recommended that students have completed a course in linear algebra.

STA 770. Quality Control & Reliability. (3 Credits)

(3) A. Analysis of six sigma techniques, statistical analysis of process capability, statistical process control using control charts, quality improvement, acceptance sampling, and an introduction to product reliability. It is strongly recommended that students have completed a course in calculus and STA 700, 721, or two courses in applied statistics.

STA 775. Statistics Methods Using SAS. (3 Credits)

(3) A. Data set manipulation, application of statistical techniques in SAS, and statistical programming. It is strongly recommended that students have completed a course in applied statistics.

STA 780. R and Introductory Data Mining. (3 Credits)

A. Cross-listed as DSC 780. Data set manipulation, application, of statistical techniques in R, statistical programming, and data mining skills. It is strongly recommended that students have completed a course in applied statistics and an introductory course in computer programming. Credit will not be awarded to students who have credit for DSC 780.

STA 785. Experimental Design. (3 Credits)

A. Completely randomized designs, factorial experiments, multiple comparisons, model diagnosis, randomized blocks, Latin squares, fixed and random models, nested-factorial experiments, 2^f factorial experiments, and split-plot designs. Emphasis on applications and use of statistical software. It is strongly recommended that students have completed a course in applied statistics.

STA 800. Applied Statistical Inference. (3 Credits)

A. Data collection, descriptive statistics, basic probability, confidence intervals, hypothesis testing, linear regression, chi-square tests, analysis of variance, and use of statistical software. Credit does not apply toward the Concentration in Applied Mathematics and Statistics or the Concentration in Data Science and Statistics under the M.A. in Applied Mathematics. Credit will not be awarded for STA 700 and STA 800.

STA 835. Linear Models. (3 Credits)

(3) A. Prerequisite: Use of matrix algebra to develop theory of linear models. General linear models, estimability, multivariate normal distribution, estimation, testing, prediction, restricted models, models with general covariance structure, reparameterization, multi-part model, and random and mixed models. It is strongly recommended that students have completed a course in applied statistics and a course in linear algebra.

STA 839. Co-op or Appl. Lrn: Statistics. (0.5-3 Credits)

A. Prerequisite: departmental approval. May be retaken with approval to a maximum of three credits. Employment with faculty and field supervision in an area related to the student's academic interests. A minimum of eighty hours of employment is required for each academic credit.

STA 840. App Multi Statistical Analysis. (3 Credits)

(3) A. Prerequisite: Analysis of variance and simple linear regression review, multiple linear regression, multivariate analysis of variance, multivariate analysis of covariance, repeated measures ANOVA, discriminant analysis, factor analysis, principal component analysis, and use of statistical software. It is strongly recommended that students have completed courses in applied statistics.

STA 880. Seminar in:_____ (1-3 Credits)

A. Advanced topics in Statistics. May be retaken to a maximum of six hours provided the topics are different. Credit towards degree requirements will depend on the course content.

STA 890. Independent Study in _____. (1-3 Credits)

A. Prerequisite: departmental approval. Independent study on a problem chosen by the student and instructor. Student must have the independent study proposal form and course syllabus approved by faculty supervisor and department chair prior to enrollment. May be retaken to a maximum of nine hours, provided the topics are different.