

**Descriptions—Spanish  
of  
Courses**

**805. Evolution of the Spanish Language**  
Spring of even-numbered years. 3(3-0) A  
student may earn a maximum of 9 credits in all  
enrollments for this course.  
Phonology, morphology and syntax of Spanish from  
its origins to the present.  
QA: SPN 805

**806. Topics in Hispanic Linguistics**  
Spring of odd-numbered years. 3(3-0) A  
student may earn a maximum of 9 credits in all  
enrollments for this course.  
Issues in Spanish language treated in light of current  
linguistic inquiry. Topics vary.  
QA: SPN 806

**807. Topics in Hispanic Culture**  
Spring of even-numbered years. 3(3-0) A  
student may earn a maximum of 9 credits in all  
enrollments for this course.  
Topics such as the Enlightenment, Post-Francist  
film, and pre-Columbian cultures.  
QA: SPN 809

**810. Studies in Medieval Spanish  
Literature**  
Spring of odd-numbered years. 3(3-0) A  
student may earn a maximum of 9 credits in all  
enrollments for this course.  
Works, genres, and writers of the Spanish Middle  
Ages. Topics vary.  
QA: SPN 802

**815. Studies in Golden Age Literature**  
Fall of even-numbered years. 3(3-0) A  
student may earn a maximum of 9 credits in all  
enrollments for this course.  
Poetry, drama, and prose of 16th and 17th century  
Spain. Topics vary.  
QA: SPN 811

**820. Cervantes**  
Fall of odd-numbered years. 3(3-0) A  
student may earn a maximum of 9 credits in all  
enrollments for this course.  
Critical study of "Don Quijote," "Novelas Ejemplares,"  
or other works.  
QA: SPN 812

**825. Studies in 18th and 19th Century  
Spanish Literature**  
Spring of even-numbered years. 3(3-0) A  
student may earn a maximum of 9 credits in all  
enrollments for this course.  
Literature from post-Baroque Spain to the Generation  
of 1898. Topics vary.  
QA: SPN 831

**830. Studies in 20th-Century Spanish  
Literature**  
Fall of odd-numbered years. 3(3-0) A  
student may earn a maximum of 9 credits in all  
enrollments for this course.  
Authors, generations, and tendencies that shape the  
directions of Spanish literature in the 20th Century.  
Topics vary.  
QA: SPN 842

**835. Spanish-American Literature before  
Modernismo**  
Spring of odd-numbered years. 3(3-0) A  
student may earn a maximum of 9 credits in all  
enrollments for this course.  
Major authors and movements from the colonial  
period to Modernismo. Topics vary.  
QA: SPN 850

**840. Contemporary Spanish-American  
Literature**  
Fall of even-numbered years. 3(3-0) A  
student may earn a maximum of 9 credits in all  
enrollments for this course.  
Poetry, drama, prose, fiction, and essay from Modern-  
ismo to the present. Topics vary.  
QA: SPN 852

**890. Independent Study**  
Fall, Spring, Summer. 1 to 3 credits. A  
student may earn a maximum of 9 credits in all  
enrollments for this course.  
R: Approval of department.  
Special projects, directed reading, and research ar-  
ranged by an individual graduate student and a  
faculty member in areas supplementing regular  
course offerings.  
QA: SPN 860

**891. Special Topics in Spanish**  
Fall, Spring, Summer. 3(3-0) A student  
may earn a maximum of 6 credits in all enroll-  
ments for this course.  
R: Approval of department.  
Special topics supplementing regular course offerings  
proposed by faculty on a group study basis for gradu-  
ate students.

**999. Doctoral Dissertation Research**  
Fall, Spring, Summer. 1 to 24 credits. A  
student may earn a maximum of 24 credits in all  
enrollments for this course.  
R: Approval of department.

QA: SPN 999

**STATISTICS AND  
PROBABILITY STT**

**Department of Statistics and  
Probability  
College of Natural Science**

**200. Statistical Methods**  
Fall, Spring, Summer. 3(4-0)  
P: MTH 103 or designated score on mathematics  
placement test. R: Not open to students with credit  
in STT 201 or STT 315 or STT 421.

Descriptive statistics, elementary probability and  
combinatorics. The binomial distribution. Random  
variables, their expectations and variances. Central  
Limit Theorem, estimation and inference. Simple tests  
based on the binomial, normal, t, chi-square and F  
distributions.  
QP: MTH 108 QA: STT 201

**201. Statistical Methods**  
Fall, Spring, Summer. 4(3-2)  
P: MTH 103 or designated score on mathematics  
placement test. R: Not open to students with credit  
in STT 200 or STT 315 or STT 421.  
Probability and statistics with computer applications.  
Data analysis, probability models, random variables,  
tests of hypotheses, confidence intervals, simple linear  
regression.  
QP: MTH 108

**315. Introduction to Probability and  
Statistics for Business**  
Fall, Spring, Summer. 3(4-0)  
P: MTH 120 or MTH 124 or MTH 132. R: Not open  
to students with credit in STT 200 or STT 201 or STT  
421.  
Probability and statistics for business majors. Data  
analysis, probability models, random variables, single  
population confidence intervals and tests of hypothe-  
ses with business applications.  
QP: MTH 111 QA: STT 315

**331. Statistics for Scientists**  
Fall, Spring. 3(3-0)  
P: MTH 120 or MTH 124 or MTH 132 or LBS 101.  
R: Open only to students in College of Natural Science.  
Calculus based course in probability and statistics.  
Probability models, random variables, tests of hypothe-  
ses, confidence intervals with applications in scienc-  
es.  
QP: LBS 113 or MTH 113

**351. Probability and Statistics for  
Engineers**  
Fall, Spring, Summer. 3(3-0)  
P: MTH 234. R: Not open to students with credit in  
STT 430.  
A calculus based course in probability and statistics  
for engineering students. Probability models, random  
variables, tests of hypotheses, and confidence inter-  
vals with engineering applications.  
QA: STT 351

**421. Statistics I**  
Fall, Spring, Summer. 3(3-0)  
P: MTH 103 or MTH 110 or MTH 116. R: Not open  
to students with credit in STT 200 or STT 201 or STT  
315.  
Basic probability, random variables, and common  
distributions. Estimation and tests for one-, two-, and  
paired sample problems. Introduction to simple linear  
regression and correlation, 1-way ANOVA.  
QP: MTH 108 QA: STT 421, STT 422

**422. Statistics II**  
Fall, Spring, Summer. 3(3-0)  
P: STT 421. R: Not open to students with credit in  
STT 464.  
Goodness of fit and other non-parametric methods.  
Linear models including multiple regression and  
ANOVA for simple experimental designs.  
QP: STT 421 QA: STT 422, STT 423

**430. Introduction to Probability and  
Statistics**  
Fall. 3(3-0)  
P: MTH 126 or MTH 133. R: Open only to Economics  
and Agricultural Economics majors. Not open to  
students with credit in STT 351.  
Calculus based probability and statistics with applica-  
tions. Discrete and continuous random variables and  
their expectations. Point and interval estimation, tests  
of hypotheses, simple linear regression.  
QP: MTH 113 or MTH 123 or MTH 480

**441. Probability and Statistics I:  
Probability**  
Fall, Spring, Summer. 3(3-0)  
P: MTH 235 or concurrently.  
Discrete and continuous distributions: univariate and  
multivariate. Normal approximation, sampling distri-  
butions and parameter estimation. Poisson process  
and applications.  
QP: MTH 215 QA: STT 441, STT 442

**442. Probability and Statistics II:  
Statistics**  
Fall, Spring. 3(3-0)  
P: STT 441, MTH 314.  
Estimation, tests of hypotheses, confidence intervals.  
Goodness of fit, non-parametric methods. Linear  
models, multiple regression, ANOVA.  
QP: STT 441 QA: STT 442, STT 443

**461. Computations in Probability and  
Statistics**  
Spring. 3(3-0)  
P: CPS 131 or CPS 230; MTH 314, STT 441.  
Computer algorithms for evaluation, simulation and  
visualization. Sampling and prescribed distributions.  
Robustness and error analysis of procedures used by  
statistical packages. Graphics for data display, compu-  
tation of probabilities and percentiles.  
QP: STT 441, MTH 334 QA: STT 461

**464. Statistical Methods for Biologists I**  
Fall. 3(3-0) Interdepartmental with Ani-  
mal Science, and Crop and Soil Sciences.  
P: STT 421.  
Biological random variables, estimation of population  
parameters, and testing hypotheses. Linear correla-  
tion and regression (prediction). Contingency tables  
and analysis of variance for comparison of biological  
groups.  
QP: STT 421 QA: STT 422

**465. Statistical Methods for Biologists II**  
Spring. 3(3-0) Interdepartmental with  
Animal Science, and Crop and Soil Sciences.  
P: STT 464.  
Concepts of reducing experimental error: covariance,  
complete and incomplete block designs, latin squares,  
split plots, repeated-measures designs, regression  
applications, and response surface designs.  
QP: STT 422 QA: ANS 871, CSS 920

- 471. Statistics for Quality and Productivity**  
Fall. 3(3-0)  
P: STT 351 or STT 422 or STT 442.  
Scientific context of quality: Box, Deming, Taguchi. Graphical techniques, control charts. Design of experiments: factorials and fractional factorials, confounding and aliasing. Engineering parameter design through experimentation.  
QP: STT 351 or STT 422 or STT 442 QA: STT 471
- 481. Issues in Statistical Practice**  
Spring. 1(1-0)  
R: Open only to seniors in Statistics.  
Selected readings and projects illustrating special problems encountered by professional statisticians in their roles as consultants, educators, and analysts.
- 490. Directed Study of Statistical Problems**  
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 9 credits in all enrollments for this course.  
R: Open only to juniors and seniors in Mathematics or Statistics. Approval of department.  
Individualized study of selected topics.  
QA: STT 490
- 825. Sample Surveys**  
Fall. 3(3-0)  
P: STT 422 or STT 442 or STT 862.  
Application of statistical sampling theory to survey designs. Simple random, stratified, and systematic samples. Sub-sampling, double sampling. Ratio and regression estimators.  
QP: STT 423 or STT 443 or STT 863 QA: STT 825
- 826. Nonparametric Statistics**  
Fall. 3(3-0)  
P: STT 442 or STT 862.  
Statistical methods based on counts, ranks, order statistics and permutations of observations. Point and interval estimates, tolerance sets, and tests valid under broad distributional assumptions. Applications to social and natural sciences.  
QP: STT 442 or STT 862 QA: STT 826
- 841. Linear Statistical Models**  
Fall. 3(3-0)  
P: STT 442 or STT 862.  
Theory and applications of statistical models with linear parameters. Curve fitting, simple and multiple regression, multiple and partial correlation. Analysis of variance, simultaneous inference, experimental design.  
QP: STT 443 or STT 863 QA: STT 841
- 843. Multivariate Analysis**  
Spring of even-numbered years. 3(3-0)  
P: STT 442 or STT 862.  
Multivariate normal distribution, tests of hypotheses on means, multivariate analysis of variance. Discriminant analysis. Principal components. Factor analysis. Analysis of frequency data.  
QP: STT 443 or STT 863 QA: STT 843
- 844. Time Series Analysis**  
Spring. 3(3-0)  
P: STT 442 or STT 862.  
Stationary time series. Autocorrelation and spectrum. ARMA and ARIMA processes: estimation and forecasting. Seasonal ARIMA models. Identification and diagnostic techniques. Multivariate time series. Time series software.  
QP: STT 443 or STT 863 QA: STT 844
- 852. Stochastic Methods in Operations Research**  
Spring. 3(3-0)  
P: STT 441 or STT 861.  
Optimization techniques related to queuing, inventory, and Markov decision models. Simulation, reliability, and decision analysis.  
QP: STT 441 or STT 861 QA: STT 852, STT 853
- 861. Theory of Probability and Statistics I**  
Fall. 3(3-0)  
P: MTH 320 or concurrently.  
Discrete and continuous random variables and vectors. Important probability models. Inequalities and limit laws. Sampling distributions and functions of random vectors. Statistical inference.  
QP: MTH 424 QA: STT 861, STT 862
- 862. Theory of Probability and Statistics II**  
Spring. 3(3-0)  
P: MTH 314, MTH 421 or concurrently; STT 861.  
Statistical inference: sufficiency, likelihood, estimation, and tests of hypotheses in parametric and non-parametric cases. Linear models and goodness of fit.  
QP: MTH 425, MTH 426 QA: STT 862, STT 863
- 871. Theory of Statistics I**  
Fall. 3(3-0)  
P: MTH 829 or MTH 921 or concurrently or STT 862; STT 881.  
Empirical distributions, quantiles, Glivenko-Cantelli Theorem. Important distributions and families. Convergences, Slutsky Theorem, asymptotics of differentiable functions. Basic concepts of decision theory. Confidence sets. Some basic statistical methods.  
QP: STT 870, MTH 822 QA: STT 872
- 872. Theory of Statistics II**  
Spring. 3(3-0)  
P: STT 871; STT 882 or concurrently.  
Theory of Neyman Pearson tests and extensions. Convex loss estimation, best unbiased estimates, sufficient statistics, information lower bounds. Extensive application to linear models. LAN families and applications to estimation and test.  
QP: STT 872 QA: STT 873, STT 955
- 881. Theory of Probability I**  
Fall. 3(3-0)  
P: MTH 828 or concurrently.  
Measures and their extensions, integration, and convergence theorems. Product measures, Lebesgue decomposition, transition probabilities, Kolmogorov consistency theorem. Independence. Classical limit theorems for partial sums.  
QP: MTH 821 QA: STT 870
- 882. Theory of Probability II**  
Spring. 3(3-0)  
P: STT 881.  
Conditional expectation, martingales, stationary processes. Brownian motion, convergence in distribution, and the invariance principle.  
QP: STT 870, MTH 822 QA: STT 882, STT 883
- 886. Stochastic Processes and Applications I**  
Fall. 3(3-0)  
P: STT 441 or STT 861.  
Finite and countable state Markov chains. Classification of states. Recurrence, branching, birth-death, Poisson renewal counting, and continuous time Markov processes.  
QP: STT 441 or STT 861 QA: STT 886, STT 864
- 887. Stochastic Processes and Applications II**  
Spring. 3(3-0)  
P: STT 886.  
Random processes in continuous time. Analysis of Markov and queueing processes with applications. Brownian motion, martingales, and stochastic calculus.  
QP: STT 441 or STT 861 QA: STT 887, STT 864
- 890. Statistical Problems**  
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
R: Approval of department.  
Individualized study on selected problems.  
QA: STT 890
- 899. Master's Thesis Research**  
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
R: Approval of department.  
QA: STT 899
- 951. Sequential Analysis and Renewal Theory**  
Fall of even-numbered years. 3(3-0)  
P: STT 872.  
Sequential estimation, testing and design. Optimal stopping. Linear and nonlinear renewal theory.  
QP: STT 929 QA: STT 954
- 952. Topics in Advanced Inference**  
Spring of even-numbered years. 3(3-0)  
P: STT 872.  
Decision theory. James-Stein, shrinkage, Bayes, and empirical Bayes estimation. Invariance. Bootstrap methodology. Inference on stochastic processes. Stochastic approximation. Survival analysis and reliability.  
QP: STT 873 QA: STT 995
- 953. Asymptotic Theory**  
Fall of odd-numbered years. 3(3-0)  
P: STT 872.  
Large sample behavior of likelihood function. Local Asymptotic Normality models. Contiguity. Bahadur and Pitman efficiency of statistical procedures.  
QP: STT 929 QA: STT 952
- 954. Semi-Nonparametric Inference**  
Spring of odd-numbered years. 3(3-0)  
P: STT 872.  
Small and large sample properties of distribution-free tests. Adaptive and robust procedures. Nonparametric ANOVA. Estimation of regression and density functions.  
QP: STT 929 QA: STT 951
- 961. Convergence of Measures and Stochastic Processes**  
Fall of even-numbered years. 3(3-0)  
P: STT 882.  
Convergence of measures on metric spaces. Prohorov's theorem. Function spaces with the uniform and Skorohod metric. Empirical processes. Applications.  
QP: STT 883 QA: STT 961
- 962. Stationary and Second Order Processes**  
Spring of even-numbered years. 3(3-0)  
P: STT 882.  
Stationary, second order, and Gaussian processes. Sample path properties. Linear and nonlinear prediction and estimation. Applications.  
QP: STT 863 QA: STT 965
- 963. Martingales**  
Fall of odd-numbered years. 3(3-0)  
P: STT 882.  
Discrete and continuous time martingales, convergence theorems, Doob-Meyer decomposition. Applications.  
QP: STT 883 QA: STT 962
- 964. Stochastic Analysis**  
Spring of odd-numbered years. 3(3-0)  
P: STT 882.  
Stochastic integrals and semi-martingales, Ito formula, stochastic differential equations. Applications.  
QP: STT 883 QA: STT 963
- 990. Problems in Statistics and Probability**  
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course.  
P: STT 872.  
Individual study on an advanced topic in statistics or probability.  
QP: STT 873, STT 883 QA: STT 990
- 995. Topics in Statistics and Probability**  
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
P: STT 882.  
Nonparametric statistics, multivariate analysis, time series analysis, Bayesian statistics, reliability theory, stochastic approximation, design of experiments, sets of decision problems, stochastic processes, or sequential analysis.  
QA: STT 995
- 999. Doctoral Dissertation Research**  
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 48 credits in all enrollments for this course.  
R: Approval of department.  
QA: STT 999