806. **Topics in Hispanic Linguistics**
Spring of even-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.

807. **Topics in Hispanic Culture**
Spring of odd-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-Francoist film, and pre-Columbian cultures. Topics vary.

810. **Studies in Medieval 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. Works, genres, and writers of the Spanish Middle Ages. Topics vary.

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.

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.

825. **Studies in 18th and 19th 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. Literature from post-Baroque Spain to the Generation of 1898. Topics vary.

830. **Studies in 20th-Century Spanish Literature**
Fall of even-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.

835. **Spanish-American Literature before Modernismo**
Spring of even-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.

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 Modernismo to the present. Topics vary.

890. **Independent Study**
Fall, Spring, Summer. 1 to 6 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 arranged by an individual graduate student and a faculty member in areas supplementing regular course offerings.

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

899. **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.

---

**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 491.

Data analysis, probability models, random variables, estimation, tests of hypotheses, confidence intervals, and simple linear regression.

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 201 or STT 315 or STT 491.

Probability and statistics with computer applications. Data analysis, probability models, random variables, tests of hypotheses, confidence intervals, simple linear regression. Weekly lab using statistical software.

203. **Statistics for Scientists**
Fall, Spring. 3(3-0).

P: MTH 100 or MTH 124 or MTH 132 or MTH 152H or LIB 118. R: Open only to students in College of Natural Science.

Calculates based course in probability and statistics. Probability models, random variables. Estimation, confidence intervals, tests of hypotheses, simple linear regression with applications in sciences.

230. **Topics in Statistics and Probability**
Fall, Spring, Summer. 1 to 3 credits.

P: MTH 103. R: Approval of Department. Individualized study of selected topics.

315. **Introduction to Probability and Statistics for Business**
Fall, Spring, Summer. 3(3-0).

P: MTH 120 or MTH 124 or MTH 132 or MTH 152. R: Not open to students with credit in STT 201 or STT 491.

A first course in probability and statistics primarily for business majors. Description, probability models, random variables, confidence intervals, and tests of hypotheses with business applications.

317. **Quantitative Business Research Methods**
Fall, Spring, Summer. 3(1) Interdepartmental with Marketing and Supply Chain Management. Administered by Marketing and Supply Chain Management.

P: STT 315. R: Open only to juniors and seniors in College of Business.

Application of statistical techniques, including forecasting, to business decision making. Includes applications of linear regression and correlation, analysis of variance, selected non-parametric tests, time series, and index numbers.

351. **Probability and Statistics for Engineers**
Fall, Spring, Summer. 3(3-0).

P: MTH 234. R: Open only to juniors and seniors. Not open to students with credit in STT 430.

Calculates based course in probability and statistics for engineering. Probability models and random variables. Estimation, confidence intervals, tests of hypotheses, simple linear regression. Other topics with applications to engineering.

431. **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.

432. **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.

433. **Introduction to Probability and Statistics**
Fall, Spring, Summer. 3(3-0).

P: MTH 126 or MTH 133. R: Open only to Economics and Agricultural Economists majors. Not open to students with credit in STT 351.

Calculates based probability and statistics with applications. Discrete and continuous random variables and their expectations. Point and interval estimation, tests of hypotheses, simple linear regression.

441. **Probability and Statistics I: Probability**
Fall, Spring, Summer. 3(3-0).

P: MTH 224


442. **Probability and Statistics II: Statistics**
Spring. 3(3-0).

P: STT 441 or MTH 314.

Estimation, tests of hypotheses, confidence intervals. Goodness of fit, non-parametric methods. Linear models, multiple regression, ANOVA.

461. **Computations in Probability and Statistics**
Spring. 3(3-0).

P: CPS 131 or CPS 330, 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. Graphs for data display, computation of probabilities and percentiles.

466. **Statistical Methods for Biologists I**
Fall. 3(3-0).

P: CPS 131 or CPS 330, MTH 314, STT 441.

471.  Statistics for Quality and Productivity  
Fall of even-numbered years. 3(3-0)  
P: SIT 351 or SIT 422 or SIT 442.  
Scientific context of quality. Box, Deming, Taguchi.  
Graphical techniques, control charts. Design of experiments;  
factorsial and fractional factorials, confounding and aliasing.  
Engineering parameter design through experimentalization.  

481.  Issues in Statistical Practice  
Fall, Spring. 1 to 3 credits. A student  
may earn a maximum of 9 credits in all enrollments for this  
course. R: Open only to seniors in Statistics. Completion of Tier  
I writing requirement. 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.  

801.  Design of Experiments  
Fall of odd-numbered years. 3(3-0)  
P: SIT 442 or SIT 445 or SIT 471  
Blocking and randomization. Split-plot, Latin square and  
factorial designs. Fractional factorial designs, aliasing  
and confounding of effects-Mixture and central composite  
designs and response surface exploration. Clinical trials.  

820.  Econometrics I  
Spring, 3(3-0) Interdepartmental with Economics  
and Agricultural Economics. Administered by Economics.  
P: EC 801, SIT 430.  
The single equation regression model. Properties of  
least-squares estimators under various specifications.  
Multicollinearity, generalized least-squares, errors in  
variables, seemingly unrelated regressions. Multivariate  
analysis and reliability. Duration mode Is. Count data.  

821.  Econometrics II  
Fall, 3(3-0) Interdepartmental with Economics  
and Agricultural Economics. Administered by Economics.  
P: EC 820, SIT 442.  
Estimation and hypothesis testing. Asymptotic properties  
of optimization estimators. Analysis of cross-sectional  
economic data. Qualitative and limited dependent  
variables. Probit, logit, tobit, and sample selectivity.  
Duration mode Is. Count data.  

822.  Econometrics III  
Spring, 3(3-0) Interdepartmental with Economics  
and Agricultural Economics. Administered by Economics.  
P: EC 820, SIT 442.  
Dynamic models and time series data. ARMA models.  
ARCH models. Unit roots, cointegration and error  
correction. Rational expectations models.  

825.  Sample Surveys  
Fall, 3(3-0)  
P: SIT 442 or SIT 445 or SIT 472  
Application of statistical sampling theory to survey  
designs. Simple random, stratified, and systematic  
samples. Sub-sampling, double sampling. Ratio and  
regressor estimators.  

826.  Nonparametric Statistics  
Fall, 3(3-0)  
P: SIT 442 or SIT 445.  
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.  

841.  Linear Statistical Models  
Fall, 3(3-0)  
P: SIT 442 or SIT 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.  

842.  Categorical Data Analysis  
Spring, 3(3-0)  
P: SIT 442 or SIT 862.  
Analysis of categorical and ordinal data: contingency  
tables; chi square tests; exact tests; log-linear models;  
measures of association; logistic regression; generalized  
linear models.  

843.  Multivariate Analysis  
Spring of even-numbered years. 3(3-0)  
P: SIT 442 or SIT 862.  
Multivariate normal distribution, tests of hypotheses  
on means, multivariate analysis of variance. Discriminant  
analysis. Principal components. Factor analysis.  
Analysis of frequency data.  

844.  Time Series Analysis  
Spring, 3(3-0)  
P: SIT 442 or SIT 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.  

852.  Stochastic Methods in Operations Research  
Spring of even-numbered years. 3(3-0)  
P: SIT 411 or SIT 861.  
Optimization techniques related to queuing, inventory,  
and Markov decision models. Simulation, reliability,  
and decision analysis.  

861.  Theory of Probability and Statistics I  
Fall, 3(3-0)  
P: MTH 528 or concurrently,  
Discrete and continuous random variables and vectors.  
Important probability models. Inequalities and limit  
laws. Sampling distributions and functions of random  
variables. Statistical inference.  

862.  Theory of Probability and Statistics II  
Spring, 3(3-0)  
P: MTH 541 or concurrently, SIT 861.  
Statistical inference: sufficiency, likelihood, estimation,  
and tests of hypotheses in parametric and nonparametric  
cases. Linear models, goodness of fit, and other topics.  

871.  Theory of Statistics I  
Fall, 3(3-0)  
P: MTH 528 or concurrently, SIT 881 or concurrently.  
Empirical distributions, quantities, Glivenko-Cantelli  
Theorem. Important distributions and families. Convergence,  
Weakly Markov, asymptotics of differentiable  
functions. Basic concepts of decision theory. Confidence  
sets. Some basic statistical methods.  

872.  Theory of Statistics II  
Spring, 3(3-0)  
P: SIT 741; SIT 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 tests.  

881.  Theory of Probability I  
Fall, 3(3-0)  
P: MTH 528 concurrently.  
Measures and their extensions, integration, and  
convexity theorems. Product measures. Lebesgue  
decomposition, transition probabilities, Kolmogorov  
consistency theorem. Independence. Classical limit  
theorems for partial sums.  

882.  Theory of Probability II  
Spring, 3(3-0)  
P: SIT 881.  
Conditional expectation, martingales, stationary  
processes. Brownian motion, convergence in distribution,  
and the invariance principle.  

886.  Stochastic Processes and Applications  
Fall, 3(3-0)  
P: SIT 411 or SIT 861.  
Finite and countable state Markov chains. Classification  
of states. Recurrence, branching, birth-death,  
Poisson and continuous time Markov processes.  

887.  Applications of Probability  
Spring, 3(3-0)  
P: SIT 411.  
Introduction to Markov chains, renewal theorem and  
queuing theory. Brownian motion, stochastic integrals  
and Ito's lemma. Applications to finance, computer  
science, engineering and economics.  

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.  

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.  

951.  Sequential Analysis and Renewal Theory  
Fall of even-numbered years. 3(3-0)  
P: SIT 872.  
Sequential estimation, testing and design. Optimal  
stopping. Linear and nonlinear renewal theory.  

952.  Topics in Advanced Inference  
Spring of odd-numbered years. 3(3-0)  
P: SIT 872.  
Topics selected from: decision theory; James-Stein,  
shrinkage, Bayes, and empirical Bayes estimation;  
invariance by the lag methodology; inference on stochastic  
processes; stochastic approximation; survival analysis  
and reliability.  

953.  Asymptotic Theory  
Fall of odd-numbered years. 3(3-0)  
P: SIT 872.  
Large sample behavior of likelihood function. Local  
Asymptotic Normality models. Consistency, Bahadur  
and Pitman efficiency of statistical procedures.  

954.  Semi-Nonparametric Inference  
Spring of even-numbered years. 3(3-0)  
P: SIT 872.  
Small and large sample properties of distribution-free  
tests. Adaptive and robust procedures. Nonparametric  
ANOVA. Estimation of regression and density functions.  

961.  Convergence of Measures and Stochastic Processes  
Fall of even-numbered years. 3(3-0)  
P: SIT 872.  
Convergence of measures on metric spaces. Prohorov's  
theorem. Function spaces with the uniform and Skorohod  
962. **Stationary and Second Order Processes**
Spring of odd-numbered years. 3(3-0)
P: STT 882.
Stationary, second order, and Gaussian processes. Sample path properties. Linear and nonlinear prediction and estimation. Applications.

963. **Martingales**
Fall of odd-numbered years. 3(3-0)
P: STT 882.
Discrete and continuous time martingales, convergence theorems, Doob-Meyer decomposition. Applications.

964. **Stochastic Analysis**
Spring of even-numbered years. 3(3-0)
P: STT 882.

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 672. R: Approval of department.
Individual study on an advanced topic in statistics or probability.

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. R: Approval of department.
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.

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.
P: Approval of department.

**STUDIO ART**

STA

**Department of Art**

**College of Arts and Letters**

110. **Drawing I**
Fall, Spring. 3 credits.
Fundamental concepts of drawing. Emphasis on observational, descriptive and analytical drawing. Practice of drawing skills using common drawing media.

111. **Drawing II**
Fall, Spring. 3 credits.
P: STA 110.
Emphasis on development of personal imagery and expression. Introduction of the means of abstraction and of the use of the human figure as subject matter.

118. **Color and Design**
Fall, Spring. 3 credits.
Basic elements of two-dimensional design. Principles of organization and the theory and practice of color as a basis for creative solutions for the problems of the artist and designer.

114. **Three-Dimensional Form**
Fall, Spring. 3 credits.
Formal elements of three-dimensional form. Application of the principles of organization as a means for producing creative solutions for the artist and designer. Related practical experience with a variety of materials and processes.

300. **Intermediate Drawing**
Fall, Spring. 3 credits.
P: STA 111, STA 113, STA 114.
Observational and imaginative drawing including the human figure. Non-representational drawing. Contemporary drawing systems, concepts, and process.

302. **Time-Space-Motion-Sound**
Spring. 3 credits.
P: STA 300. R: Not open to freshmen and sophomores.
Multi-dimensional forms of artistic expression and their interrelationships. Theory and exploration.

320. **Painting I**
Fall, Spring. 3 credits.
P: STA 111, STA 113, STA 114.
Representational painting of landscape, figure, and still life imagery. Painting concepts, materials, and techniques.

325. **Painting II**
Fall, Spring. 3 credits.
P: STA 320.
Continuation of representational painting, and introduction to non-representational painting and concepts.

340. **Ceramics I**
Fall, Spring. 3 credits.
P: STA 111, STA 113, STA 114.
Ceramic processes including handbuilding, glaze formulation, and kiln firing.

345. **Ceramics II**
Fall, Spring. 3 credits.
P: STA 340.
Continued development of ceramic forming and kiln firing techniques including handbuilding, glaze formulation, mold making, casting, and wheel throwing.

350. **Figure Modeling**
Fall, Spring. 3 credits.
P: STA 111, STA 113, STA 114.
Modeling human and natural forms.

351. **Collage, Mixed Media, Assemblage**
Fall, Spring. 3 credits.
P: STA 111, STA 113, STA 114.
Exploration of artistic expression using collage, mixed media, and assemblage techniques.

354. **Casting**
Fall, Spring. 3 credits.
P: STA 111, STA 113, STA 114.
Casting concepts and techniques as a means of artistic expression.

355. **Construction and Fabrication**
Fall, Spring. 3 credits.
P: STA 111, STA 113, STA 114.
Sculptural concepts using methods of construction and fabrication as an approach to artistic expression.

360. **Graphic Design**
Fall, Spring. 3 credits.
P: STA 111, STA 113, STA 114.
Graphic signs and symbols used in visual communication. Application of design principles to experimental and practical problem solving.

370. **Photography**
Fall, Spring. 4(2-4)
P: STA 111, STA 113, STA 114.
History and basic technology of black and white photography, integrative camerawork, and darkroom processing. Issues in photographic aesthetics. Students furnish camera and all materials.

400. **Advanced Drawing**
Fall, Spring. 4 credits.
P: STA 300.
Drawing with an emphasis on a wide range of current drawing concepts, materials, and techniques. Advanced non-representational drawing. Application to individual thematic development.

405. **Metalsmithing**
Fall of even-numbered years. 4 credits.
P: STA 111, STA 113, STA 114.
Forming, joining, finishing and embellishing processes for metals to create small sculpture or jewelry.

407. **Art in London**
Summer. 3 credits. Given only in London, England.
P: STA 111, STA 113, STA 114.
Study in London, England, of a variety of art disciplines. Visits to museums, galleries, monuments and other relevant sites, with some field trips away from the city. Meetings with artists.

420. **Painting**
Fall, Spring. 4 credits. A student may earn a maximum of 20 credits in all enrollments for this course.
P: STA 325.
Advanced applications of painting concepts, styles and techniques. Consideration of the language of contemporary painting.

430. **Relief Printing**
Fall, Spring. 4 credits. A student may earn a maximum of 20 credits in all enrollments for this course.
P: STA 300 or STA 320.
Theory and practice of relief prints including additive methods, linocut and woodcut.

431. **Screen Printing**
Fall, Spring. 4 credits. A student may earn a maximum of 20 credits in all enrollments for this course.
P: STA 300 or STA 320.
Screen printing as a fine art print medium. Theory and techniques as a means to creative and expressive imagery.

432. **Lithography**
Fall, Spring. 4 credits. A student may earn a maximum of 20 credits in all enrollments for this course.
P: STA 300 or STA 320.
Lithographic process as an artistic medium. Techniques of the medium. Preparing the plate or stone, printing, and using tusche, wash and rubbing as means to creative imagery.

433. **Intaglio**
Fall, Spring. 4 credits. A student may earn a maximum of 20 credits in all enrollments for this course.
P: STA 300 or STA 320.
Aesthetic principles and techniques such as line etching, soft ground, aquatint, dry point, wax resist, collograph, and monoprints.

435. **Handmade Paper**
Spring of odd-numbered years. 4 credits. A student may earn a maximum of 20 credits in all enrollments for this course.
P: STA 300 or STA 320.
Handmade paper as an art form. Basic techniques including lamination, layering, folding and vacuum forming.

440. **Ceramics**
Fall, Spring. 4 credits. A student may earn a maximum of 20 credits in all enrollments for this course.
P: STA 345.
Development of aesthetic and technical skills with particular focus on contemporary issues of content and concept. Includes opportunity for supervised individual study.