EXPERIMENTAL STATISTICS

General education courses are marked with stars (*).

2000 Introduction to Microcomputers (3) F,S,Su 2 hrs. lecture; 2 hrs. lab. Credit will not be given for this course and CSC 1100, ISDS 1100, and LIS 2001. A user-oriented introduction to microcomputers and applications software; terminology; hardware; software: the operating system, word processing, spreadsheets, data management, graphics, communications.

2201 Introduction to Statistical Analysis (4) F,S 3 hrs. lecture; 2 hrs. lab. Prereq.: MATH 1021 or equivalent. Descriptive statistics; inferential statistical methods including confidence interval estimation and hypothesis testing for one and two population means and proportions; one-way analysis of variance; simple linear regression and correlation; analysis of categorical data.

2215 Exploratory Statistical Data Analysis (3) V Prereq: EXST 2201 or equivalent. 2 hrs. lecture; 2 hrs. lab. Graphical analysis, perception, and construction rules; descriptive statistics; graphs for data exploration and decision making.

2301 Statistical Analysis II (4) S Prereq.: EXST 2201 or equivalent. 3 hrs. lecture; 2 hrs. lab. Applied statistical modeling: multiple regression, variable selection, serial correlation, repeated measures, multivariate tools, logistic regression, blocking and factorial designs, categorical data analysis, and nonparametric techniques.

3999 Supervised Independent Study and Research (1-4) V Prereq.: consent of instructor. May be taken for a max. of 8 sem. hrs. of credit with consent of department head. Investigation of areas of interest not covered in other departmental courses, under the guidance of departmental faculty.

4012 Introduction to Sampling Techniques (3) Su Prereq.: EXST 2201 or equivalent. Simple random, stratified random, cluster, systematic, multistage, and unequal probability sampling procedures methods and applications; ratio and regression estimation; non-response and non-sampling errors.

4050 Principles and Theory of Statistics (4) F Prereq.: EXST 2201 or equivalent and MATH 1550 or equivalent. 3 hrs. lecture; 2 hrs. lab. Probability distributions as models for real-world processes; sampling distributions and the central limit theorem; estimation and confidence region methods; principles of hypothesis testing; modeling; emphasis on links between theory, methodology, and application.

4085 Seminar in Statistics (1) V Prereq.: consent of instructor. May be repeated for credit when topics vary. Topics not covered in other experimental statistics courses.

4087 Special Topics in Applied Statistics (3) V Prereq.: EXST 2201 or equivalent. May be taken for a max. of 6 sem. hrs. of credit when topics vary.

7003 Statistical Inference I (3) F 3 hrs. lecture; 2 hrs. lab. Prereq.: MATH 1021 or equivalent. Credit will be given for only one of the following: EXST 7003, 7004, 7005. Basic concepts of statistical models and sampling; descriptive and inferential methods; normal, t, chi-square, and F distributions; tests of hypothesis and estimation, analysis of variance, correlation, regression, analysis of categorical data; emphasis on social and behavioral sciences research problems; computer software applications.

7004 Experimental Statistics I (4) F,S,S 3 hrs. lecture; 2 hrs. lab. Prereq.: MATH 1021 or equivalent. Credit will be given for only one of the following: EXST 7003, 7004, 7005. Basic concepts of statistical models and use of samples; measures of variation and central tendency; normal, t, chi-square, and F distributions; test of hypothesis, analysis of variance, regression, and correlation; emphasis on laboratory-oriented sciences research problems; computer software applications.

7005 Statistical Techniques I (4) F,S 3 hrs. lecture; 2 hrs. lab. Prereq.: MATH 1021 or equivalent. Credit will be given for only one of the following: EXST 7003, 7004, 7005. Basic concepts of statistical models and sampling methods, descriptive statistical measures, distributions, tests of significance, analysis of variance, regression, correlation, and chi-square; emphasis on field-oriented life sciences research problems; computer software applications.

7111 Nonparametric Statistics I (3) Su Prereq.: EXST 7003 or 7004 or 7005 or equivalent. Nonparametric tests for one- and two-sample location and distribution tests, including binomial, chi-square, Kolmogorov-Smirnov, Mann-Whitney U, Wilcoxon; analyses of variance, including Cochran's Q, Kruskal-Wallis; Friedman; correlation and regression, including Kendall's tau, Spearman's rho, and point biserial.

7102 Fundamental Sampling Techniques (3) Su Prereq.: EXST 7003 or 7004 or 7005 or equivalent. Sample and stratified random sampling; ratio and regression estimation; cluster, multistage, and multiphase sampling procedures, systematic sampling; nonresponse and nonsampling errors, links between methodology and application emphasized.

7131 Statistical Inference II (4) S Prereq.: EXST 7003 or equivalent. 3 hrs. lecture; 2 hrs. lab. Credit will be given for only one of the following: EXST 7013, 7014, 7015. Analyses of variance and experimental designs; completely randomized and complete block designs; Latin square designs; split plot; arrangements of treatments; multiple comparisons; covariance analysis; multiple and curvilinear regression techniques; emphasis on social and behavioral sciences research problems.

7104 Experimental Statistics II (4) F,S 3 hrs. lecture; 2 hrs. lab. Prereq.: MATH 1021 or equivalent. Credit will be given for only one of the following: EXST 7003, 7004, 7005. Multiple classification analysis of variance and covariance, individual degrees of freedom, factorial arrangement of treatments, and multiple regression; emphasis on science/laboratory research problems.

7105 Statistical Techniques II (4) F,S,S 3 hrs. lecture; 2 hrs. lab. Prereq.: MATH 1021 or equivalent. Credit will be given for only one of the following: EXST 7003, 7004, 7005. Multiple classification analyses of variance and covariance, sampling designs, parameter estimation, multiple regression and correlation, tests of specific hypothesis, and factorial experiments; emphasis on field-oriented life sciences research problems.

7222 Statistical Aspects of Quantitative Genetics (3) V Prereq.: EXST 7014 or equivalent and AGRI 2072 or equivalent. Statistical aspects of quantitative inheritance; partitioning of variance; covariances among relatives; theory of inbreeding; estimation and testing of genetic parameters; best linear prediction of genetic merit; mixed model application; selection theory.

7223 Advanced Topics in Statistical Genetics (3) V Prereq.: EXST 4050 or equivalent and 7022. Topics not covered in other experimental statistics courses, such as best linear unbiased prediction of genetic merit; likelihood-based methods for genetic parameter estimation; analysis of selected populations; methods for quantitative genetic analysis of discrete data.

7242 Biological Population Statistics I (3) V Prereq.: EXST 7005 or equivalent. Specialized sampling for estimation of plant and animal population parameters including density and abundance, survival, recruitment, space-use, and spatial pattern; methods used include quadrants, line transects, plotless sampling techniques, change-in-ratio estimators including capture-recapture and exploitation or catch-per-effort estimators, and home range models.

7245 Biological Population Statistics II (3) V Prereq.: EXST 7014 or equivalent. Extensive development and application of statistical techniques to parameter estimation in population dynamics; principles of model building and role of model building in population management.

7301 Experimental Design (3) S Prereq.: EXST 7013 or 7014 or 7015 or equivalent. Comparison of designs, models, and analyses; emphasis on factorial experiments, complete and incomplete block designs, and confounding.

7302 Survey Design (3) V Prereq.: EXST 7014 or equivalent. Comparison of experimental and quasi-experimental designs; repeated measures, covariance analysis, and confounding in factorial experiments; emphasis on social and behavioral science research problems.

7304 Regression Analysis (3) F Prereq.: EXST 7013 or 7014 or 7015 or equivalent; and knowledge of matrix algebra. Fundamentals of regression analysis, stressing an understanding of underlying principles; response surfaces, variable selection techniques, and nonlinear regression.

7342 Applied Least-Squares (3) S Prereq.: EXST 7013 or 7014 or 7015 or equivalent. Applications of least squares methods; usual constraints, no constraints, and means model constraints to unbalanced cross classified and nested data; emphasis on analysis of variance and covariance for fixed effects models.

7362 Categorical Data Analysis (3) F Prereq.: EXST 7013 or 7014 or 7015 or equivalent. Statistical techniques used in analyzing data from discrete distributions; contingency tables, loglinear and logit models, logistic regression, and repeated measures for nominal and ordinal data; emphasis on computer analysis and interpretation.

7375 Multivariate Analysis (3) F Prereq.: EXST 7014 or 7015 or equivalent; and knowledge of matrix algebra. Comparison of multivariate techniques and analyses; emphasis on discriminant analysis, factor analysis and principal component analysis, canonical correlation, cluster analysis, and multivariate analysis of variance;

7382 Statistical Methods for Spatial Data (3) F Prereq.: EXST 7003, 7004, or 7005. Overview of statistical methods for spatial data with emphasis on data analysis: fixed point spatial data, point pattern data, area data; topics include spatial correlation, variograms, kriging and spatial prediction; spatial sampling; and spatial experimental design; applications from other disciplines are encouraged, course work includes relevant statistical software and term project.

7391 Statistical Methods for Reliability and Survival Data (3) S Prereq.: EXST 7014 or 7015. Characteristics of lifetime data; non-parametric methods including Kaplan Meier estimation; lifetime parametric models, parametric methods for single distribution data; planning life test; system reliability concepts; failure time
regression; accelerated testing.

7051 Applied Bayesian Inference (3) V Prereq.: EXST 7003 or 7004 or 7005; or equivalent. Basic decision theory applications, useful sampling distributions and convenient priors, Bayesian statistical inference, and Bayesian analysis of multiple decision problems.

7060 Probability and Statistics (3) F Prereq.: MATH 2057 or equivalent. Probability, random variables, discrete and continuous distribution functions; expected values, moment generating functions; functions of random variables.

7061 Statistical Theory (3) S Prereq.: EXST 7060 or equivalent. Point estimation; hypothesis testing; interval estimation; large sample theory; new developments in statistical inference.

7062 Advanced Topics in Statistical Theory (3) V Prereq.: EXST 7061. May be repeated for credit when topics vary. Topics of current interest; emphasis on theoretical development of statistical methodology.

7083 Practicum in Statistical Consulting I (2) Su Prereq.: EXST 7013 or 7014 or 7015, and permission of instructor. 4 hrs. independent study. Pass-fail grading. Supervised application of statistical techniques to research problems; readings, oral presentations, and discussions on statistical consulting; problem-solving; mock-consulting sessions; participation in real-life statistical consulting sessions under faculty supervision.

7084 Practicum in Statistical Consulting II (2) F,S,Su Prereq.: EXST 7083 and permission of instructor. 4 hrs. independent study. Pass-fail grading. May be taken for a max. of 6 sem. hrs. credit. Primary responsibility for statistical consulting projects under the supervision of graduate faculty.


7086 Advanced Seminar in Statistics (1) F,S,Su Prereq.: consent of instructor. May be repeated for credit when topics vary. Pass-fail grading. Develop and present a 50-minute seminar on an advanced topic in statistics as a part of the department's seminar series.

7087 Advanced Topics in Statistics (1-3) V Prereq.: consent of instructor. May be repeated for credit when topics vary. Lectures on advanced topics in statistics not covered in other experimental statistics courses.

7099 Independent Study (1-3) Prereq.: Permission of instructor. May be taken for a max. of 9 sem. hrs. of credit when topics vary. Independent study under the guidance of graduate faculty.

8000 Thesis Research (1-12 per sem.) “S”/“U” grading.