Courses and Descriptions

Undergraduate Courses

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. [*GENERAL EDUCATION COURSE]

3201 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 design, 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.

Senior and Graduate Courses

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

4025 SAS Programming (3) Su Prereq.: EXST 2201 or equivalent. Reading, processing, manipulating, transforming, and outputting data in various formats; descriptive and summary statistics procedures; subsetting and combining data sets; DO loops and arrays; industry standard programming practices.

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.

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.

Graduate Courses

7003 Statistical Inference 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, 7009. 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 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, 7009. Basic concepts of statistical models and use of samples; measures of variation and central tendency; normal, t, chi-
Courses and Descriptions

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, 7009. 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.

7009 Statistical Methods I—Web-Based (3) V Prereq.: MATH 1021 or equivalent and knowledge of SAS statistical analysis software. Credit will be given for only one of the following: EXST 7003, 7004, 7005, 7009. Basic concepts of statistical models and use of samples; measures of variation and central tendency, normal, t, chisquare, and F distributions; tests of hypothesis; analysis of variance, regression, and correlation; emphasis on field oriented life science research problems.

7011 Nonparametric Statistics (3) Su Prereq.: EXST 7003 or 7004 or 7005 or equivalent. Nonparametric 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.

7012 Fundamental Sampling Techniques (3) S Prereq.: EXST 7003 or 7004 or 7005 or equivalent. Simple 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.

7013 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, 7019. 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.

7014 Experimental Statistics II (4) F Prereq.: EXST 7004 or equivalent. 3 hrs. lecture; 2 hrs. lab. Credit will be given for only one of the following: EXST 7013, 7014, 7015, 7019. Multiple classification analysis of variance and covariance, individual degrees of freedom, factorial arrangement of treatments, and multiple regression; emphasis on science/laboratory research problems.

7015 Statistical Techniques II (4) F,S Prereq.: EXST 7005 or equivalent. 3 hrs. lecture; 2 hrs. lab. Credit will be given for only one of the following: EXST 7013, 7014, 7015, 7019. 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.

7019 Statistical Methods II—Web-Based (3) V Prereq.: EXST 7003 or 7004 or 7005 or 7009 or equivalent and knowledge of SAS statistical analysis software. Credit will be given for only one of the following: EXST 7013, 7014, 7015, 7019. Multiple classification analyses of variance and covariance; sampling designs, parameter estimation, multiple regression and correlation, tests of specific hypotheses, and factorial experiments; emphasis on field-oriented life science research problems.

7025 Biological Population Statistics II (3) V Prereq.: EXST 7015 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.
Courses and Descriptions

**7031 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.

**7034 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.

**7036 Categorical Data Analysis (3) S** 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.

**7037 Multivariate Statistics (3) F** Prereq.: EXST 7013 or 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.

**7039 Statistical Methods for Reliability and Survival Data (3) S** Prereq.: EXST 7013 or 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.

**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.

**7083 Practicum in Statistical Consulting I (2) V** 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.

**7142 Statistical Data Mining (3) F** Prereq.: EXST 7013, 7014, 7015, 7019, or equivalent. Data preparation tools; model prediction; objects grouping; and variables classification.
Courses and Descriptions

**EXST 7151 Bayesian Data Analysis (3)** Prereq.: EXST 7013 or EXST 7014 or EXST 7015 and EXST 7060 or consent of department head. Introduction to Bayesian statistical methods and their application in fields such as agriculture, biology, engineering and medicine; topics include non-informative, conjugate and elicited priors; posterior development; common single and multiple parameter models such as binomial, normal, Poisson, and exponential; hierarchical models; hypothesis testing and credible sets; posterior simulation via Markov Chain Monte Carlo; and performance of Bayesian procedures.

**7152 Advanced Topics in Statistical Modeling (3)** Prereq.: EXST 7013 or 7014 or 7015 and EXST 7034 or equivalent or consent of department head. Regularized linear regression and classification methods; penalized spline fitting to normal and non-normal data; tree-based methods; ensemble methods including boosting; support vector machine and kernel-based methods.

**7999 Independent Study (1-3) F,S,Su** 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.**