Courses and Descriptions

Undergraduate Courses

2000 Introduction to Microcomputers (3) F,S,Su *2 hrs. lecture; 2 hrs. lab. Credit will not for 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]*

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.

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 non-parametric 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.

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*.

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.

Courses and Descriptions

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-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) Su *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.

Courses and Descriptions

7022 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; covariance among relatives; theory of inbreeding; estimation and testing of genetic parameters; best linear prediction of genetic merit; mixed model application; selection theory.

7023 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.

7024 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 quadrats, line transects, plotless sampling techniques, change-in-ratio estimators including capture-recapture and exploitation or catch-per-effort estimators, and home range models.

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.

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.

7032 Survey Design (3) V Prereq.: *EXST 7013 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.

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.

7035 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.

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.

7038 Statistical Methods for Spatial Data (3) F *Prereq.: EXST 7013, 7014, 7015 or 7019*. 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.

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.

Courses and Descriptions

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.

7085 Special Problem in Statistics (1-3) F,S,Su *Prereq.: permission of department. Pass-fail grading*. A technical paper on an advanced topic in statistics is required. Development of a topic in advanced statistics under faculty supervision.

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.

7151 Bayesian Data Analysis (3) V *Prereq.: EXST 7013 or 7014 or 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 noninformative, 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..

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*.