Statistics Courses

Courses

STAT 5195. Graduate Seminar.
Graduate Seminar (1-0) Conferences and discussions of various topics in mathematics and statistics by faculty, graduate students, and outside speakers. Required of all graduate students during each semester of full-time enrollment. May not be counted more than once toward the degree requirement.
1 Credit Hour
1 Total Contact Hour
0 Lab Hour
1 Lecture Hour
0 Other Hour

STAT 5329. Statistical Programming.
Statistical Programming (1-2). Introduction to statistical programming using statistical software packages such as SAS and R. Emphasis on methods of data entry, data management, and creation of statistical reports. Topics covered include data manipulation, creation of user-defined functions, simulation methods, random variable generation, permutation methods, the bootstrap, the jackknife and methods of increasing computational efficiency.
3 Credit Hours
3 Total Contact Hours
2 Lab Hours
1 Lecture Hours
0 Other Hours

STAT 5335. Applied Experimental Design.
This course covers the basic principles of experimental design, the analysis of variance method, the difference between fixed and random effects and between nested and crossed effects, discussion of confounding effects, and multiplicity adjustments. The designs covered include completely random, randomized block, Latin squares, split- plot, factorial, fractional factorial, nested treatments and variance component analysis.
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

Prerequisite(s): (STAT 5428 w/B or better)

STAT 5336. Categorical Data Analysis.
Categorical Data Analysis (3-0) Analysis of multifactor contingency tables: table structure, summary measures of association, goodness-of-fit and independence tests, exact tests for small samples. Generalized linear models: logit, probit and loglinear mode estimating model parameters, model selection and checking. Emphasis will be placed on application of these techniques to analyze biological data.
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

Prerequisite(s): (STAT 5428 w/C or better)

STAT 5354. Post-Genomic Analysis.
Post-Genomic Analysis (2-3) Extraction and confirmation of information from entire and partially assembled genome sequences based on experimental and statistical analysis. Includes the experimental design, application, and data analysis of DNA arrays, SNPs, and applied proteomics in the identification and verification of expressed genes of interest. (Same course as BINF 5354 and BIOL 5354. Credit cannot be earned for more than one of BINF 5354, BIOL 5354, and STAT 5354.).
3 Credit Hours
5 Total Contact Hours
3 Lab Hours
2 Lecture Hours
0 Other Hours

STAT 5370. Special Topics.
Special Topics (3-0) Various topics not included in regular courses will be discussed. May be repeated once for credit as the topics vary.
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

STAT 5380. Mathematical Statistics I.
Mathematical Statistics I (3-0) The probabilistic foundations of mathematical statistics. Probability spaces, random variables, univariate and multivariate probability distributions, conditional distributions, expectation, generating functions, multivariate transformations, modes of convergence, and limit theorems.
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

Prerequisite(s): (STAT 3330 w/C or better)

STAT 5381. Mathematical Statistics II.
Mathematical Statistics II (3-0) A continuation of Mathematical Statistics I. Parametric statistical models, sufficiency, exponential families, methods of estimation, comparison of estimators, confidence intervals, hypothesis testing, optimal tests, likelihood ratio tests, large sample theory.
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

STAT 5385. Statistics in Research.
Statistics in Research (3-0) An introduction to statistical modeling of a univariate response conditional on a set of explanatory variables. Classical formulation of multiple linear regression and analysis of variance. Some discussion of experimental design from power considerations. Selected topics from generalized linear models, nonparametric regression, and quasi-likelihood estimation. Emphasis is on model building, fitting, validations, and subsequent inferences. Analysis of real data using major statistical software packages.
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

Prerequisite(s): (MATH 3323 w/C or better) AND (STAT 4380 w/C or better)

STAT 5386. Stochastic Processes.
Stochastic Processes (3-0) Random walks, discrete time Markov chains, and Poisson Process. Further topics such as continuous time Markov chains, branching processes, renewal theory, and estimation in branching processes.
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

Prerequisite(s): (MATH 4341 w/C or better) OR (MATH 5321 w/C or better) AND (STAT 3330 w/C or better) OR (STAT 5380 w/C or better)

STAT 5388. Multivariate Data Analysis.
Multivariate Data Analysis (3-0) Statistical analysis of a multivariate response. Multivariate multiple linear regression, principal components, factor analysis, canonical correlation, and discriminate analysis. Applications with the use of statistical packages will be considered.
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

Prerequisite(s): (STAT 5385 w/C or better)

STAT 5390. Nonparametric Statistics.
Nonparametric Statistics (3-0) Distribution-free statistical methods; nonparametric one and two sample tests and analysis of variance; goodness-of-fit tests; nonparametric measures of association; and robust procedures.
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

Prerequisite(s): (STAT 5380 w/C or better)

STAT 5391. Time Series Analysis.
Time Series Analysis (3-0) Time domain and frequency domain aspects of discrete time stationary processes, correlation functions, power spectra, filtering, linear systems, and arma models for non-stationary series. An introduction to the analysis of multiple time series. Some use of statistical software will be included.
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

Prerequisite(s): (STAT 5380 w/C or better)

STAT 5392. Statistical Computing.
Statistical Computing (3-0) Modern computational techniques and their application to various statistical models. Topics include Bayesian concepts such as prior and posterior distributions, Monte Carlo methods (such as MC integration and importance sampling), Markov chain Monte Carlo (MCMC) methods, including Gibbs sampling and Metropolis- Hastings algorithms. Additional topics may include Laplace approximation, methods for imputation of missing data, and bootstrapping. The techniques are applied to statistical methods such as linear regression, generalized linear models, capture-recapture models, mixture models and time series models.
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

Prerequisite(s): (MATH 4326 w/C or better) AND (STAT 4380 w/C or better)

STAT 5396. Graduate Research.
Graduate Research (3-0) A written report on an appropriate subject in mathematics or statistics is required. May not be counted towards the 24 hours of course work in the thesis option, but may be substituted for three hours of thesis credit. May not be repeated for credit.
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

STAT 5398. MS Thesis.
MS Thesis (0-0-3) Initial work on the thesis.
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
0 Lecture Hours
3 Other Hours

STAT 5399. MS Thesis.
MS Thesis (0-0-3) Continuous enrollment required while work on thesis continues.
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
0 Lecture Hours
3 Other Hours

Prerequisite(s): (STAT 5398 w/P or better)

STAT 5428. Intro to Statistical Analysis.
Introduction to Statistical Analysis (3-2) Fundamental techniques for statistical data analysis, including basic probability concepts, inference about means and variances of two populations, analysis of variance and covariance, least squares and logistic regression, categorical data analysis, nonparametric tests and experimental design. Analysis of biological and other data sets using statistical software packages, checking validity of modeling assumptions, and alternatives when modeling assumptions are not satisfied. Computer simulations are used to illustrate concepts such as power and confidence level. Open to students of all disciplines.
4 Credit Hours
5 Total Contact Hours
2 Lab Hours
3 Lecture Hours
0 Other Hours

STAT 5474. Introduction to Data Mining.
Introduction to techniques for data mining and analytics with emphasis on R programming and hands-on experience with real data; topics covered: dimension reduction, cluster analysis, ordinary and partial least squares regression, principal components regression, ridge regression, l1-regularization, logistic regression, assessment of classifier, decision/regression trees, bagging and boosting, random forests, and data visualization techniques.
4 Credit Hours
4 Total Contact Hours
1 Lab Hours
3 Lecture Hours
0 Other Hours

Prerequisite(s): (STAT 5428 w/B or better)

STAT 5494. Statistical Data Mining.
General statistical techniques for unsupervised and supervised learning, with more emphasis on methodology; topics covered: association rules, outlier detection, PageRank, parametric nonlinear regression; optimization, conventional nonparametric regression methods (including kernel smoothing/ regression and smoothing and regression splines), generalized additive models (GAM), multivariate adaptive regression splines (MARS), recursive partitioning and extensions, hierarchical mixture of experts (HME), projection pursuit regression, artificial neural networks (ANN), support vector machine (SVM), and naive Bayes classifier.
4 Credit Hours
4 Total Contact Hours
1 Lab Hours
3 Lecture Hours
0 Other Hours

Prerequisite(s): (STAT 4380 w/B or better AND STAT 5380 w/B or better)