

Course Offerings

330 Introductory Statistics / 3 Credits

Frequency tables, histograms, probability, well-known probability distributions, one and two sample tests of hypotheses, confidence intervals, and contingency tables.

Prereq: MATH 103, 104, or 107. (ND: MATH)

331 Regression Analysis / 2 Credits

Simple and multiple regression techniques and correlation coefficients. Extensive use of SAS. Emphasis on applications.

Prereq: STAT 330

367 Probability / 3 Credits

Probability, probability distributions for discrete random variables, probability density functions, marginal joint probability density functions, expected value and variance, and transformations.

Prereq: MATH 147 or 166

368 Statistics / 3 Credits

Moments, moment generating functions, central limit theorem, one and two sample tests of hypotheses, estimation, and simple linear regression and correlation.

Prereq: STAT 367

450/650 Stochastic Processes / 3 Credits

Discrete time Markov chains, Poisson processes, continuous time Markov chains, birth and death processes, renewal processes, branching processes, queuing systems, and applications.

Prereq: STAT 368

451/651 Bayesian Statistical Decision Theory / 3 Credits

Bayesian approach to statistics including utility and loss, prior and posterior densities, and Bayesian inference. Comparisons with classical statistical methods.

Prereq: STAT 368 or 468

460/660 Applied Survey Sampling / 3 Credits

Simple random, stratified, systematic and cluster sampling; two-stage sampling. Estimation of population means and variances. Ratio and regression estimators.

Prereq: STAT 330 or 368

461/661 Applied Regression Models / 3 Credits

Simple linear regression, matrix approach to multiple regression, and introduction to various tests and confidence intervals. Includes discussion of multicollinearity and transformations.

Prereq: STAT 330 or 368, knowledge of matrix algebra

462/662 Introduction to Experimental Design / 3 Credits

Fundamental principles of designing an experiment, randomized block, Latin square, and factorial. Also covers analysis of covariance and response surface methodology.

Prereq: STAT 330 or 368

463/663 Nonparametric Statistics / 3 Credits

Various tests and confidence intervals that may be used when the underlying probability distributions are unknown, including the Wilcoxon, Kruskal-Wallis, and Friedman.

Prereq: STAT 330 or 368

464/664 Discrete Data Analysis / 3 Credits

Application of binomial, hypergeometric, Poisson, mixed Poisson, and multinomial distributions in discrete data analysis. Log-linear models and contingency tables. Logistic regression. Discrete discriminant analysis.

Prereq: STAT 368

465/665 Meta-Analysis Methods / 3 Credits

Statistical methods for meta-analysis with applications. Various parametric effect size from a series of experiments: fixed effect, random effect linear models; combining estimates of correlation coefficients; meta-analysis in the physical and biological sciences.

Prereq: STAT 331, 461/661 or 725

467 Probability and Mathematical Statistics I / 3 Credits

Random variables, discrete probability distributions, density functions, joint and marginal density functions, transformations, limiting distributions, central limit theorem.

Prereq: MATH 265 or STAT 368

468 Probability and Mathematical Statistics II / 3 Credits

Properties of estimators, confidence intervals, hypotheses testing, Neyman-Pearson lemma, likelihood ratio tests, complete and sufficient statistics.

Prereq: STAT 467

470/670 Statistical SAS Programming / 3 Credits

Focuses on statistical problem solving and writing SAS computer code. Data types, data management, data input/output, SAS as a programming language, data analysis, report writing and graphing.

Prereq: STAT 461/661, 462/662, or 726

472/672 Time Series / 3 Credits

Estimation of trend in time series data. Seasonal models. Stationary models. Moving average, autoregressive and ARMA models. Model identification. Forecasting. Intervention analysis.

Prereq: STAT 468/768, 461/661, course in matrix algebra

476 Actuary Exam Study II / 1 Credit

Selected material from probability and mathematical statistics in preparation for the national actuarial exam.
Prereq: STAT 368 or 468

477/677 Introductory Survival and Risk Analysis I / 3 Credits

Survival distributions, life tables, and various risk models, intended to prepare students for taking higher level actuarial exams: SOA1 Course FM/CAS2 Exam 2 and SOA Course MLC/CAS Exam 3L.
Prereq: STAT 367 or STAT 467

478/678 Introductory Survival and Risk Analysis II / 3 Credits

Distribution of the random variable-the time until failure of a joint-life status, life tables, competing risks and multiple decrement probabilities, Markov chain and Poisson models, intended to prepare students for taking the actuarial exams: SOA1 Course MLC/CAS2 Exam 3L.
Prereq: STAT 477 or STAT 677

725 Applied Statistics / 3 Credits

Data description, probability, inference on means, proportions, difference of means and proportions, categorical data, regression, analysis of variance and multiple comparisons.
Prereq: Knowledge of algebra

This course is not intended for statistics or mathematics majors.

726 Applied Regression and Analysis of Variance / 3 Credits

Simple and multiple regression, ANOVA tables, correlation, regression diagnostics, selection procedures, analysis of covariance, one-way ANOVA, two-way ANOVA.
Prereq: STAT 725

This course is not intended for statistics or mathematics majors.

730 Biostatistics / 3 Credits

Direct assays, parallel line assays, slope ratio assays, multiple assays, and quantal assays. Model, estimation and testing. Probit and logit analysis.
Prereq: STAT 461/661 or 725

732 Introduction to Bioinformatics / 3 Credits

An introduction to the principles of bioinformatics including statistical techniques for the analysis of one or more gene sequences and computational techniques of knowledge discovery from biological data.
Prereq: STAT 461/661
Cross-listed with MATH 735 and CSCI 732

761 Advanced Regression / 3 Credits

Multiple regression, analysis of residuals, model building, regression diagnostics, multicollinearity, robust regression, and nonlinear regression.

Prereq: STAT 468/768, 461/661, course in matrix algebra

762 Messy Data Analysis / 3 Credits

One-way classification models with heterogeneous error. Two-way classification analysis in the unbalanced case. Analysis of mixed models. Split-plot, nested and crossover designs.

Prereq: STAT 462/662

764 Multivariate Methods / 3 Credits

Sample geometry, correlation, multiple, partial, canonical correlation test of hypothesis on means, multivariate analysis of variance, principal components, factor analysis, and discriminant analysis.

Prereq: STAT 461/661 or 462/662, course in matrix algebra

767 Probability and Mathematical Statistics I / 3 Credits

Random variables, discrete probability distributions, density functions, joint and marginal density functions, transformations, limiting distributions, central limit theorem. Additional project required.

Prereq: MATH 265 or STAT 368

768 Probability and Mathematical Statistics II / 3 Credits

Properties of estimators, confidence intervals, hypotheses testing. Neyman-Pearson Lemma, likelihood ratio tests, complete and sufficient statistics. Additional project required.

Prereq: STAT 767

770 Survival Analysis / 3 Credits

Presents basic methodology in the analysis of censored data, two basic types of censoring, parametric estimation, nonparametric estimation, and life table methods.

Prereq: STAT 768

772 Computational Statistics / 3 Credits

Assortment of computational statistics and statistical computing techniques. Specific topics include: random variable generation, optimization and root finding, resampling statistics, Monte Carlo methods, statistical graphics, non-linear and generalized least squares, and the EM algorithm.

Prereq: STAT 661 and STAT 768

774 Linear Models I / 3 Credits

General linear models. Full rank models. Estimation, confidence ellipsoids and tests of hypotheses. Not full rank models. Applications to regression and design of experiments.

Prereq: STAT 768, course in matrix algebra

777 Multivariate Theory / 3 Credits

Wishart distribution, distribution of Hotelling's T-square and Lambda statistics, cluster analysis, correspondence analysis, principal components, factor analysis, discriminant analysis, multidimensional scaling.

Prereq: Stat 764

778 Modern Probability Theory

Probability theory presented from the measure theoretic perspective. Emphasis on various types of convergence and limit theorems. Discussion of random walks, conditional expectations, and martingales.

Prereq: STAT 768 or MATH 750

Cross-listed with MATH

780 Asymptotics, Bootstrap, and Other Resampling Plans / 3 Credits

Development of large sample and small sample properties of a variety of estimators.

Prereq: STAT 768

786 Advanced Inference / 3 Credits

Further discussion of properties of estimators, theory of estimation, and hypotheses testing.

Prereq: STAT 768

The following variable credit courses are also offered:

690, 790 Seminar / 1-3 Credits

696, 796 Special Topics / 1-5 Credits

793 Individual Study / 1-5 Credits

794 Consulting/Presentation Practicum / 1 Credit

797 Master's Paper / 1-3 Credits

797R Paper Continuing Registration / 1 Credit

798 Master's Thesis / 1-6 Credits

798R Theses Continuing Registration / 1 Credit

799 Doctoral Dissertation / 1-15 Credits

799R Dissertation Continuing Registration / 1 Credit