

STATISTICS (STAT)

Courses

STAT 5501 Statistical Design Of Experiments Credits: 3

This course is designed to present a variety of experimental design techniques to students with moderate mathematical and statistical background. The course includes three major components: efficient factorial designs, linear and quadratic process optimization of the location parameter, and variability reduction. Students will be trained to use the SPSS statistical software package.

Prerequisites: STAT 436.

STAT 5537 Mathematical Statistics I Credits: 3

Probability theory, distribution functions, sampling, statistical inference, topics in advanced applied statistics. Continued in STAT 5547.

Prerequisites: MATH 402.

STAT 5547 Mathematical Statistics II Credits: 3

Continuation of STAT 5537.

STAT 5551 Applied Statistical Analysis Credits: 3

Methods for analyzing data from experiments and observational studies; design-based and model-based inferences; model assessment; ANOVA; power analysis; SAS procedures.

Prerequisites: STAT 441.

STAT 5561 Time Series Analysis Credits: 3

This course is intended to present the basis knowledge (including models, methods and concepts) of time series analysis to students with a good background in intermediate mathematical statistics. Some elementary knowledge of basic linear regression analysis would be helpful but not necessary. The presentation will be balanced between theory and data analysis, with sufficient theory to understand the basis of methods and a broad variety of models and many real data examples. Case studies will be drawn from business and economics, network traffic and meteorology, and data will be analyzed by students using existing computer programs (SAS, Minitab and R). Students are also expected to understand proper use and limits of time series models.

Prerequisites: STAT 441.

STAT 5563 Nonparametric Statistics Credits: 3

This course covers the theory and application of commonly used distribution-free test statistics. Unlike parametric statistics, it teaches how to do statistical inference without making any assumptions on population distributions. This includes nonparametric methods for one sample, paired samples, two independent samples and three or more samples. Nonparametric methods will be practiced using real-world problems.

Prerequisites: STAT 441

STAT 5565 Regression Analysis Credits: 3

Simple linear regression; multiple linear regression; correlation analysis; model selections; checking assumptions; regression diagnostics; combating multi-collinearity; nonlinear regression.

Prerequisites: STAT 441.

STAT 5572 Multivariate Analysis Credits: 3

Random vectors; multivariate normal distributions; Hotelling's T-square distribution; Wishart distribution; inferences on one mean vector; MANOVA; inferences on covariance matrices; profile analysis.

Prerequisites: MATH 420 and STAT 441.

STAT 5575 Stochastic Calculus for Finance Credits: 3

This course presents the basic idea and theory of stochastic calculus with the focus on the applications to finance. Topics include Brownian motion, Ito integral, Ito formula, Black-Scholes equation and formula, risk-neutral pricing, connections with partial differential equations, exotic options, American derivative securities, and term structure models for interest rates.

Prerequisites: MATH 402 and STAT 436.

STAT 5576 Probability Credits: 3

Existence and extension of measure, random variable, expectation and its properties, types of convergence, law of large numbers, weak convergence, central limit theorem, and martingale.

Prerequisites: STAT 436 and MATH 5513.

STAT 5578 Advanced Mathematical Statistics Credits: 3

Exponential and location families, principles of data reduction, asymptotic distributions, advanced theory of estimation and hypothesis testing.

Prerequisites: STAT 5547.

STAT 5588 Theory of Linear Model Credits: 3

This course covers vector space, full rank linear model, general inverse, estimation under linear constraints interval estimation, hypothesis testing, distributions of quadratic forms, general distribution theory, estimability, Gauss-Markov theorem, Best Linear Unbiased Estimation (BLUE), regression on dummy variables, estimation of variance components, Scheffe and Turkey intervals, and non-full rank linear model.

Prerequisites: MATH 420, STAT 5537, and STAT 5565.

STAT 5590 Special Topics Credits: 1-3

Selected topics in various fields of mathematics. May be repeated for credit when the topic varies.

STAT 5599 Statistics Research and Thesis Credits: 1-12

Students may enroll in only one section of STAT 5599 per semester. Consent number required at registration.