

VIII Graduate-Credit Courses Offered by the Department

Course: STT 441 Probability and Statistics I: Probability

Semester: Fall of every year, Spring of every year, Summer of every year

Credits: Total Credits: 3 *Lecture/Recitation/Discussion Hours: 3*
3(3-0)

Recommended

Background: MTH 234 or MTH 254H or LBS 220

Description: Probability models and basic statistics at an intermediate mathematical level. Discrete, continuous, univariate, and multivariate distributions. Random variables. Normal approximation. Sampling distributions, parameter estimation, and elementary tests of hypotheses.

Course: STT 442 Probability and Statistics II: Statistics

Semester: Spring of every year

Credits: Total Credits: 3 *Lecture/Recitation/Discussion Hours: 3*
3(3-0)

Recommended

Background: STT 441 and (MTH 309 or MTH 314 or MTH 415)

Description: Estimation, testing hypotheses and simple and multiple regression analysis. Time series: ARMA (Auto Regressive Moving Average) and ARIMA (Auto Regressive Integrated Moving Average) models, data analysis and forecasting.

Course: STT 455 Actuarial Models

Semester: Spring of every year

Credits: Total Credits: 3 *Lecture/Recitation/Discussion Hours: 3*
3(3-0)

Recommended

Background: STT 441 and MTH 360

Description: Stochastic models used in insurance. Survival distributions, life insurance, life annuities, benefit premiums, benefit reserves, and analysis of benefit reserves.

Interdepartmental

With: Mathematics

Course: STT 461 Computations in Probability and Statistics

Semester: Spring of every year

Credits: Total Credits: 3 *Lecture/Recitation/Discussion Hours: 3*
3(3-0)

Recommended

Background: (CSE 131 or CSE 230) and (MTH 314 and STT 441)

Description: Computer algorithms for evaluation, simulation and visualization. Sampling and prescribed distributions. Robustness and error analysis of procedures used by statistical packages. Graphics for data display, computation of probabilities and percentiles.

Course: STT 471 Statistics for Quality and Productivity

Semester: Fall of even years

Credits: Total Credits: 3 *Lecture/Recitation/Discussion Hours: 3*
3(3-0)

Recommended

Background: STT 351 or STT 422 or STT 442

Description: Scientific context of quality: Box, Deming, Taguchi. Graphical techniques, control charts. Design of experiments: factorials and fractional factorials, confounding and aliasing. Engineering parameter design through experimentation.

Course: STT 490 Directed Study of Statistical Problems

Semester: Fall of every year, Spring of every year, Summer of every year

Credits: Variable from 1 to 3

Reenrollment

Information: A student may earn a maximum of 9 credits in all enrollments for this course.

Restrictions: Open only to juniors or seniors in the Department of Mathematics or Department of Statistics and Probability. Approval of department.

Description: Individualized study of selected topics.

Course: STT 801 Design of Experiments

Semester: Fall of odd years

Credits: Total Credits: 3 *Lecture/Recitation/Discussion Hours: 3*
3(3-0)

Recommended

Background: STT 422 or STT 442 or STT 465 or STT 471

Description: Blocking and randomization. Split-plot, latin square and factorial designs. Fractional factorial designs, aliasing and confounding of effects. Mixture and central composite designs and response surface exploration. Clinical trials.

Course: STT 814 Advanced Statistics for Biologists

Semester: Spring of every year

Credits: Total Credits: 4 *Lecture/Recitation/Discussion Hours: 3* *Lab Hours: 2*
4(3-2)

Recommended

Background: STT 464

Description: Concepts of reducing experimental error for biological and agricultural research. Covariance, randomized block designs, latin squares, split plots, repeated-measures designs, regression applications, and response surface designs. Analyses using statistical software.

Interdepartmental

With: Animal Science, Crop and Soil Sciences

Course: STT 825 Sample Surveys

Semester: Fall of every year

Credits: Total Credits: 3 *Lecture/Recitation/Discussion Hours: 3*
3(3-0)

Recommended

Background: STT 422 or STT 442 or STT 862

Description: Application of statistical sampling theory to survey designs. Simple random, stratified, and systematic samples. Sub-sampling, double sampling. Ratio and regression estimators.

Course: STT 843 Multivariate Analysis

Semester: Spring of even years

Credits: Total Credits: 3 *Lecture/Recitation/Discussion Hours: 3*
3(3-0)

Recommended

Background: STT 442 or STT 862

**Not open to
students with**

credit in: FW 850

Description: Multivariate normal distribution, tests of hypotheses on means, multivariate analysis of variance. Discriminant analysis. Principal components. Factor analysis. Analysis of frequency data.

Course: STT 844 Time Series Analysis

Semester: Spring of odd years

Credits: Total Credits: 3 *Lecture/Recitation/Discussion Hours: 3*
3(3-0)

Recommended

Background: STT 442 or STT 862

Description: Stationary time series. Autocorrelation and spectra. ARMA and ARIMA processes: estimation and forecasting. Seasonal ARIMA models. Identification and diagnostic techniques. Multivariate time series. Time series software.

Course: STT 847 Analysis of Survival Data

Semester: Spring of even years

Credits: Total Credits: 3 *Lecture/Recitation/Discussion Hours: 3*
3(3-0)

Recommended

Background: STT 422 or STT 442 or STT 862

Description: Analysis of lifetime data. Estimation of survival functions for parametric and nonparametric models. Censored data. The Cox proportional hazards model. Accelerated failure time models. Frailty models. Use of statistical software packages.

Interdepartmental

With: Epidemiology

Course: STT 855 Statistical Genetics

Semester: Fall of odd years

Credits: Total Credits: 3 *Lecture/Recitation/Discussion Hours: 3*
3(3-0)

Recommended

Background: STT 442 or STT 862

Description: Probabilistic and statistical methods for genetic linkage and association studies. Quantitative trait locus mapping.

Effective Dates: FALL 2007 - Open

Course: STT 861 Theory of Probability and Statistics I

Semester: Fall of every year

Credits: Total Credits: 3 *Lecture/Recitation/Discussion Hours: 3*
3(3-0)

Recommended

Background: MTH 320 or concurrently

Description: Discrete and continuous random variables and vectors. Important probability models. Inequalities and limit laws. Sampling distributions and functions of random vectors. Statistical inference.

Course: STT 862 Theory of Probability and Statistics II

Semester: Spring of every year

Credits: Total Credits: 3 *Lecture/Recitation/Discussion Hours: 3*
3(3-0)

Recommended

Background: STT 861 and (MTH 415 or concurrently)

Description: Statistical inference: sufficiency, likelihood, estimation, and tests of hypotheses in parametric and nonparametric cases. Linear models, goodness of fit, and other topics.

Course: STT 863 Applied Statistics Methods I

Semester: Fall of every year

Credits: Total Credits: 3 *Lecture/Recitation/Discussion Hours: 3*
3(3-0)

Recommended

Background: (STT 442 or STT 862) and (MTH 415 or concurrently)

Description: Application of regression models including simple and multiple regression, model diagnostics, model selection, one- and two-way analysis of variance, mixed effects models, randomized block designs, and logistic regression.

Semester Alias: STT 841

Course: STT 864 Applied Statistical Methods II

Semester: Spring of odd years

Credits: Total Credits: 3 *Lecture/Recitation/Discussion Hours: 3*
3(3-0)

Recommended

Background: STT 863

Description: Generalized linear models, loglinear models, hierarchical models, repeated measures, discriminant analysis and classification, clustering, regression, classification trees, selected nonparametric methods.

Course: STT 865 Modern Statistical Methods

Semester: Spring of even years

Credits: Total Credits: 3 *Lecture/Recitation/Discussion Hours: 3*
3(3-0)

Recommended

Background: STT 863

Description: Modern statistical methods. Applicability and computer implementation. Resampling methods, including the bootstrap. Markov chain Monte Carlo methods. Survival analysis. Nonparametric curve estimation.

Course: STT 871 Theory of Statistics I

Semester: Fall of every year

Credits: Total Credits: 3 *Lecture/Recitation/Discussion Hours: 3*
3(3-0)

Recommended

Background: (MTH 828 or concurrently) and (STT 881 or concurrently)

Description: Empirical distributions, quantiles, Glivenko-Cantelli Theorem. Important distributions and families. Convergences, Slutsky Theorem, asymptotics of differentiable functions. Basic concepts of decision theory. Confidence sets. Some basic statistical methods.

Course: STT 872 Theory of Statistics II

Semester: Spring of every year

Credits: Total Credits: 3 *Lecture/Recitation/Discussion Hours: 3*
3(3-0)

Recommended

Background: STT 871 and (STT 882 or concurrently)

Description: Theory of Neyman Pearson tests and extensions. Convex loss estimation, best unbiased estimates, sufficient statistics, information lower bounds. Extensive application to linear models. LAN families and applications to estimation and tests.

Course: STT 881 Theory of Probability I

Semester: Fall of every year

Credits: Total Credits: 3 *Lecture/Recitation/Discussion Hours: 3*
3(3-0)

Recommended

Background: MTH 828 or concurrently

Description: Measures and their extensions, integration, and convergence theorems. Product measures, Lebesgue decomposition, transition probabilities, Kolmogorov consistency theorem. Independence. Classical limit theorems for partial sums.

Course: STT 882 Theory of Probability II

Semester: Spring of every year

Credits: Total Credits: 3 *Lecture/Recitation/Discussion Hours: 3*
3(3-0)

Recommended

Background: STT 881

Description: Conditional expectation, martingales, stationary processes. Brownian motion, convergence in distribution, and the invariance principle.

Course: STT 886 Stochastic Processes and Applications

Semester: Fall of every year

Credits: Total Credits: 3 *Lecture/Recitation/Discussion Hours: 3*
3(3-0)

Recommended

Background: STT 441 or STT 861

Description: Markov chains and their applications in both discrete and continuous time, including classification of states, recurrence, limiting probabilities. Queuing theory, Poisson process and renewal theory.

Course: STT 888 Stochastic Models in Finance

Semester: Spring of even years

Credits: Total Credits: 3 *Lecture/Recitation/Discussion Hours: 3*
3(3-0)

Recommended

Background: STT 441 or STT 861

Description: Stochastic models used in pricing financial derivatives. Discrete-time models. Brownian motion. Stochastic integrals and Ito's formula. Basic Black-Scholes model. Risk neutral distribution. European and American options. Exotic options. Interest rate market, futures, and interest rate options.

Semester Alias: STT 887

Effective Dates: FALL 2007 - Open

Course: STT 890 Statistical Problems

Semester: Fall of every year, Spring of every year, Summer of every year

Credits: Variable from 1 to 3

Reenrollment

Information: A student may earn a maximum of 24 credits in all enrollments for this course.

Restrictions: Approval of department.

Description: Individualized study on selected problems.

Course: STT 899 Master's Thesis Research

Semester: Fall of every year, Spring of every year, Summer of every year

Credits: Variable from 1 to 6

Reenrollment

Information: A student may earn a maximum of 36 credits in all enrollments for this course.

Restrictions: Approval of department.

Description: Master's thesis research.

Course: STT 953 Asymptotic Theory

Semester: Fall of even years

Credits: Total Credits: 3 *Lecture/Recitation/Discussion Hours: 3*
3(3-0)

Recommended

Background: STT 872

Description: Asymptotics of M- and R- estimators. Asymptotically efficient and adaptive procedures.

Effective Dates: FALL 2007 - Open

Course: STT 954 Semi-Nonparametric Inference

Semester: Fall of odd years

Credits: Total Credits: 3 *Lecture/Recitation/Discussion Hours: 3*
3(3-0)

Recommended

Background: STT 872

Description: Robust procedures in regression and time series settings, nonparametric curve estimation, survival analysis in non- and semi-parametric models.

Course: STT 961 Convergence of Measures and Stochastic Processes

Semester: Spring of odd years

Credits: Total Credits: 3 *Lecture/Recitation/Discussion Hours: 3*
3(3-0)

Recommended

Background: STT 882

Description: Convergence of measures on metric spaces. Prohorov's theorem. Function spaces with the uniform and Skorokhod metric. Empirical processes. Weak convergence of Martingales. Applications.

Effective Dates: FALL 2008 - Open

Course: STT 964 Stochastic Analysis

Semester: Spring of even years

Credits: Total Credits: 3 *Lecture/Recitation/Discussion Hours: 3*
3(3-0)

Recommended

Background: STT 882

Description: Stochastic integrals and semi-martingales, Ito formula, stochastic differential equations. Applications.

Course: STT 990 Problems in Statistics and Probability

Semester: Fall of every year, Spring of every year, Summer of every year

Credits: Variable from 1 to 3

Reenrollment

Information: A student may earn a maximum of 6 credits in all enrollments for this course.

Recommended

Background: STT 872

Restrictions: Approval of department.

Description: Individual study on an advanced topic in statistics or probability.

Course: STT 996 Advanced Topics in Probability

Semester: Fall of every year, Spring of every year, Summer of every year

Credits: Total Credits: 3 *Lecture/Recitation/Discussion Hours: 3*
3(3-0)

Reenrollment

Information: A student may earn a maximum of 15 credits in all enrollments for this course.

Recommended

Background: STT 882

Restrictions: Approval of department.

Description: Current topics in probability.

Course: STT 997 Advanced Topics in Statistics

Semester: Fall of every year, Spring of every year, Summer of every year

Credits: Total Credits: 3 *Lecture/Recitation/Discussion Hours: 3*
3(3-0)

Reenrollment

Information: A student may earn a maximum of 15 credits in all enrollments for this course.

Recommended

Background: STT 872

Restrictions: Approval of department.

Description: Topics selected from non- and semi parametric statistics, multivariate analysis, time series analysis, Bayesian statistics, regression and kernel estimation, and other topics in advanced statistics.

Course: STT 999 Doctoral Dissertation Research

Semester: Fall of every year, Spring of every year, Summer of every year

Credits: Variable from 1 to 24

Reenrollment

Information: A student may earn a maximum of 120 credits in all enrollments for this course.

Restrictions: Approval of department.

Description: Doctoral dissertation research.