Course Master Catalog

STAT

STAT6021

Mathematical Statistics I

The purpose of these courses is to understand the theory of statistical inference using techniques, definitions, and concepts that are statistical and that are natural extensions and consequences of the statistical concepts. Specific topics include in Probability and Distributions, Multivariate Distributions, Some Special Statistical Distributions, Unbiasedness, Consistency, and Limiting Distributions and Central Limit Theorem. Credit Level:U,G Credit Hrs:3 Pre-req: See your college advisor for details. Baccalaureate Competency: Critical Thinking, Effective Communication, Information Literacy, Knowledge Integration.

STAT6022

Mathematical Statistics II

The purpose of these courses is to understand the theory of statistical inference using techniques, definitions, and concepts that are statistical and that are natural extensions and consequences of the statistical concepts. Specific topics include in Basics of statistical Inferences including point and interval estimation, Method of Moments and Maximum Likelihood estimation, Hypothesis testing, Sufficiency, Exponential family, Rao-Blackwell Theorem and Rao-Cramer Lower Bounds, Likelihood Ratio Tests, Neymann-Pearson Lemma and its applications. Credit Level:U,G Credit Hrs:3 Pre-req: See your college advisor for details. Baccalaureate Competency: Critical Thinking, Effective Communication, Information Literacy, Knowledge Integration, Social Responsibility.

STAT6031

Applied Regression Analysis

The purpose of these courses is to understand statistical inference and data analysis in simple linear regression model and multiple linear regression models including model selections. Specific topics include: correlation coefficient, statistical inference of parameters, checking model assumptions, variable selection, transformations of variables and diagnostics. Credit Level:U,G Credit Hrs:3 Pre-req: See your college advisor for details. Baccalaureate Competency: Critical Thinking, Effective Communication, Information Literacy, Knowledge Integration, Social Responsibility.

STAT6032

Design and Analysis of Experiments

The course covers the theory and application of analysis of variance with one-, two-, and higher-way layouts, random effects and mixed models. Mathematical and interpretational aspects of the models will be covered along with statistical estimation, confidence intervals and multiple hypothesis testing. SAS statistical software will be used.Specific topics include: ANOVA for some standard experimental designs. Credit Level:U,G Credit Hrs:3 Pre-req: See your college advisor for details. Baccalaureate Competency: Critical Thinking, Effective Communication, Information Literacy, Knowledge Integration, Social Responsibility.

STAT6041

Time Series

This course will cover the basics of time series analysis, including autocorrelation, moving averages, autoregressive models, seasonality, forecasting, spectral analysis, Box Jenkins ARIMA models, and transfer function models and multivariate ARIMA models. Credit Level:U,G Credit Hrs:3 Pre-req: See your college advisor for details. Baccalaureate Competency: Critical Thinking, Effective Communication, Information Literacy, Knowledge Integration, Social Responsibility.

STAT6042

Survival Analysis and Logistic Regression

This course will begin with a detailed description of maximum likelihood. It will then discuss generalized linear models, including logistic and Poisson regression. Finally various topics in survival analysis will be covered: namely Kaplan-Meier curves and log-rank statistics, Weibull regression, and Cox proportional hazard regression. Examples from medicine and engineering will be given. SAS and S-plus statistical software will be used. Credit Level:U,G Credit Hrs:3 Pre-req: See your college advisor for details. Baccalaureate Competency: Critical Thinking, Effective Communication, Information Literacy, Knowledge Integration, Social Responsibility.

STAT6043

Applied Bayesian Analysis

Foundation of Bayesian Statistics, basic theory and several applications including Monte Carlo and Markov Chain Monte Carlo Methods for computing Bayesian inference will be covered. Specific topics include: Foundation of Bayesian Approach, Prior and Posterior distributions; Choice of Priors: subjective and non-subjective or default approaches; Inference using posterior distribution for standard models; and Hierarchical models, and their applications. WinBUGS will be introduced. Credit Level:U,G Credit Hrs:3 Pre-req: See your college advisor for details. Baccalaureate Competency: Critical Thinking, Effective Communication, Information Literacy, Knowledge Integration, Social Responsibility.

STAT6044

Nonparametric Statistics

Rank-based statistical inference will be covered. Topics include, but are not limited to, the one- and two-sample location problems including the Wilcoxon signed-rank and rank-sum test, Spearman correlation coefficient, one- and two-way Analysis-of-Variance tests, and Kolmogorov-Smirnov test for testing different distributions. In addition, the multiple comparisons issue will be discussed, specifically by comparing several treatments with and without a control treatment. Null distributions of test statistics will be discussed in the small sample and asymptotic cases, with and without ties. Credit Level:U,G Credit Hrs:3 Pre-req: See your college advisor for details. Baccalaureate Competency: Critical Thinking, Effective Communication, Information Literacy, Knowledge Integration, Social Responsibility.

STAT6045

Statistical Computing with SAS and S-plus

This course will cover the basics of using the SAS and S-plus statistical software. Topics covered include: importing external files, subsetting and merging data files, performing statistical procedures, graphics, matrix calculations, and macros and functions. Credit Level:U,G Credit Hrs:3 Pre-req: See your college advisor for details. Baccalaureate Competency: Critical Thinking, Effective Communication, Information Literacy, Knowledge Integration.

STAT7020

Topics in Applied Statistics

The course will cover special topics of statistics that are of interest to students and faculty. Such topics may include those that are not covered in other courses, or extensions of other courses. Credit Level:G Credit Hrs:3 Pre-req: See your college advisor for details.

STAT7021

Linear Models and Multivariate Analysis I

The course will cover multivariate normal distribution, distributions of quadratic forms, theory of Analysis of variance as applied to linear regression in full-rank models, estimability and testability in non-full-rank models, and generalized inverse and its use in such models, various types of sums of squares in ANOVA of designed models, associated estimable and testable functions in balanced and unbalanced designs with fixed effects, random effects and mixed effects, and nested and crossed factors. Estimation and testing of fixed effects and variance components using ANOVA Sums of Squares will be covered. SAS will be extensively used to apply these concepts with real data. Credit Level:G Credit Hrs:4 Pre-req: See your college advisor for details.

STAT7022

Linear Models and Multivariate Analysis II

The course will cover estimation and testing in mixed models using ML and REML methods, Split Plot designs, repeated measures. The course will also cover topics in Multivariate Statistics, including estimation, test of hypothesis such as Hotelling T-square and MANOVA, Principal components, Factor analysis and, depending on interest Cluster Analysis and Discriminant Analysis. Credit Level:G Credit Hrs:4 Pre-req: See your college advisor for details.

STAT7023

Linear Models and Multivariate Analysis I

The course will cover topics in estimable functions, repeated measurements model, generalized linear model, multivariate statistics, including estimation, test of hypothesis such as Hotelling T-square, MANOVA, principal components, factor analysis, cluster analysis, and discriminant analysis. Students will be expected to have a strong background in both graduate-level mathematical statistics (STAT 6022) and Design and Analysis of Experiments (STAT 6032). Credit Level:G Credit Hrs:4 Pre-req: See your college advisor for details.

STAT7024

Linear Models and Multivariate Analysis II

The course will cover multivariate normal distribution, distribution of quadratic forms of and their ratios, and the theory of estimation and testing in the general linear model. It will also cover statistical methods for multiple comparisons, and model fitting and inference for fixed effect, random effect, and mixed effects models. Students will be expected to have a strong background in both graduate-level mathematical statistics (STAT 6022) and Design and Analysis of Experiments (STAT 6032). This course may be taken independently of STAT 7023. Credit Level:G Credit Hrs:4 Pre-req: See your college advisor for details.

STAT7031

Statistics Theory

The course will cover the following topics in depth: Distribution theory, Estimation, Hypotheses testing, Asymptotic behavior of statistics, basics of Bayesian methods, and Decision theory. Credit Level:G Credit Hrs:4 Pre-req: See your college advisor for details.

STAT7032

Probability

Measure theoretic foundations of probability: random variables, expected value (Lebesgue integral). Laws of large numbers, weak convergence. Characteristic functions, central limit theorem. Conditional probability, conditional expectation. Students will be expected to have a strong background in theoretical mathematics or statistics. A good knowledge of multivariable calculus and an introduction to analysis is a must. Advanced Calculus (MATH 6001/6002), Mathematical Statistics (STAT 6021/6022), or equivalent is recommended. Credit Level:G Credit Hrs:4

STAT8021

Advanced Theory of Statistics

The course will cover topics including Frequentist and Bayesian Decision theory, Empirical and Hierarchical Bayesian methods, and choice of topics from sequential methods, bootstrap, large sample theory etc. Credit Level:G Credit Hrs:3 Pre-req: See your college advisor for details.

STAT8022

Advanced Bayesian Analysis

The course will cover, Choice of priors for estimation and testing, Bayes factors and calculation, Model selection and related computational methods, and choice of topics. Credit Level:G Credit Hrs:3 Pre-req: See your college advisor for details.

STAT8023

Advanced Statistics Computing

EM algorithm and its variations, Importance sampling, Markov Chain Monte Carlo methods, and choice of topics. Credit Level:G Credit Hrs:3 Pre-req: See your college advisor for details.

STAT8024

Advanced Statistical Modeling

Special topics of interest will be discussed. Credit Level:G Credit Hrs:3

STAT8025

Spatial Statistics

This course is about spatial data, spatial statistical models, and their proper fitting, summary, and interpretation. It is designed to introduce students to the nature of spatial data and the special analysis tools that help to analyze such data. The course will cover a blend of theory, applications, and software and will cover the three major types of spatial data: geostatistical, areal, and spatial point process. Credit Level:G Credit Hrs:3 Pre-req: See your college advisor for details.

STAT8026

Practicum in Applied Statistics

This course is intended for graduate students who obtain internships in applied statistics. Credit Level:G Credit Hrs:1

STAT9081

Seminar in Statistics

Participants will present recent results in their area of research interest in statistics.This course can be repeated. Credit Level:G Credit Hrs:1 - 3

STAT9082

Seminar in Statistics

Participants will present recent results in their area of research interest in statisticsThis course can be repeated. Credit Level:G Credit Hrs:1 - 3

STAT9091

Thesis Research

Writing a doctoral dissertation.This course can be repeated. Credit Level:G Credit Hrs:1 - 12

STAT9092

Thesis Research

Writing a doctoral dissertation.This course can be repeated. Credit Level:G Credit Hrs:1 - 12

STAT9093

Research

Research in statistics.This course can be repeated. Credit Level:G Credit Hrs:1 - 12

STAT9094

Research

Research in statistics.This course can be repeated. Credit Level:G Credit Hrs:1 - 12

STAT9095

Readings

Independent work on advanced statistics texts and papers.This course can be repeated. Credit Level:G Credit Hrs:1 - 12

STAT9096

Readings

Independent work on advanced statistics texts and papers.This course can be repeated. Credit Level:G Credit Hrs:1 - 12