

STATISTICS (STAT)

Courses

STAT 5000. Biostatistics and Epidemiology. 3 Credits.

Introductory design and analysis of medical studies. Epidemiological concepts, case-control and cohort studies. Clinical trials. Students evaluate statistical aspects of published health science studies. Understand the relevance of published public health research to clinical practice. Prerequisite: Graduate student or Instructor permission.

STAT 5010. Gr Applied Data Analysis. 3 Credits.

Fundamental data processing, code development, graphing and analysis using statistical software packages. Analysis of data and interpretation of results. Project-based. Prerequisites: Graduate student or Instructor permission; content knowledge of STAT 1410, STAT 2430, or STAT 3210 assumed.

STAT 5210. Advanced Stat Methods & Theory. 3 Credits.

Parametric and non-parametric two-sample tests. Multiple regression and correlation. Matrix representations. Basic experimental design. Analysis of variance (fixed, random, and mixed models). Statistical Software usage. Prerequisites: Graduate student or Instructor permission; content knowledge of STAT 2830 assumed.

STAT 5230. Appld Multivariate Analysis. 3 Credits.

Multivariate normal distribution. Inference for mean vectors and covariance matrices. Multivariate analysis of variance (MANOVA), discrimination and classification, principal components, factor and cluster analysis. Prerequisite: STAT 3210, matrix algebra recommended.

STAT 5290. Survivl/Logistic Regression. 3 Credits.

Models and inference for time-to-event and binary data. Censored data, life tables, Kaplan-Meier estimation, logrank tests, proportional hazards models. Logistic regression-interpretation, assessment, model building, special topics. Prerequisite: Graduate student or Instructor permission; content knowledge of STAT 3210 or STAT 5210 assumed.

STAT 5310. Experimental Design. 3 Credits.

Randomization, complete and incomplete blocks, cross-overs, Latin squares, covariance analysis, factorial experiments, confounding, fractional factorials, nesting, split plots, repeated measures, mixed models, response surface optimization. Prerequisites: Graduate student or Instructor permission; content knowledge of STAT 3210 or STAT 5210 assumed; content knowledge of STAT 5010 recommended.

STAT 5350. Categorical Data Analysis. 3 Credits.

Measures of association and inference for categorical and ordinal data in multiway contingency tables. Log linear and logistic regression models. Prerequisite: Graduate student or Instructor permission; content knowledge of STAT 3210 or STAT 5210 assumed.

STAT 5510. Probability Theory. 3 Credits.

Distributions of random variables and functions of random variables. Expectations, stochastic independence, sampling and limiting distributions (central limit theorems). Concepts of random number generation. Prerequisites: Graduate student or Instructor permission; content knowledge of MATH 2248, STAT 2510 assumed.

STAT 5530. Appl Time Series&Forecastng. 3 Credits.

Autoregressive moving average (Box-Jenkins) models, autocorrelation, partial correlation, differencing for nonstationarity, computer modeling. Forecasting, seasonal or cyclic variation, transfer function and intervention analysis, spectral analysis.

STAT 5610. Statistical Theory. 3 Credits.

Point and interval estimation, hypothesis testing, and decision theory. Application of general statistical principles to areas such as nonparametric tests, sequential analysis, and linear models. Prerequisite: STAT 5510.

STAT 5870. Data Science I - Experience. 3 Credits.

Data harvesting, cleaning, and summarizing; working with non-traditional, non-numeric data (social network, natural language textual data, etc.); scientific visualization; advanced data pipelines with a practical focus on real datasets and developing good habits for rigorous and reproducible computational science; Project-based. Prerequisites: Graduate student; Instructor permission; knowledge of CS 1210 and either STAT 1410 or STAT 2430 assumed; knowledge of CS 2100 and MATH 2522 or MATH 2544 strongly recommended. Cross-listed with: CSYS 5870, CS 5870.

STAT 5990. Special Topics. 1-18 Credits.

See Schedule of Courses for specific titles.

STAT 6300. Bayesian Statistics. 3 Credits.

Introduction to Bayesian inference. Posterior inference, predictive distributions, prior distribution selection. MCMC algorithms. Hierarchical models. Model checking and selection. Use of computer software. Prerequisite: Content knowledge of STAT 5510 assumed.

STAT 6391. Master's Thesis Research. 1-6 Credits.

Research for the Master's Thesis.

STAT 6600. Linear Models. 3 Credits.

Theory of linear models, least squares and maximum likelihood estimation, fixed, random and mixed models, variance component estimation, introduction to generalized linear models, bootstrapping. Prerequisite: Content knowledge of MATH 2522 or MATH 2544 assumed.

STAT 6810. Statistical Research. 1-3 Credits.

Methodologic or data analytic research culminating in oral and written reports to the faculty. Prerequisite: Instructor permission.

STAT 6850. Consulting Practicum. 1-3 Credits.

Supervised field work in statistical consulting. Experiences may include advising UVM faculty and students or clients in applied settings such as industry and government agencies. Prerequisites: Second year Graduate student in Statistics or Biostatistics; permission of Statistics Program Director.

STAT 6870. Data Science II. 3 Credits.

Advanced data analysis, collection, and filtering; statistical modeling, monte carlo statistical methods, and in particular Bayesian data analysis, including necessary probabilistic background material; a practical focus on real datasets and developing good habits for rigorous and reproducible computational science. Prerequisite: STAT 3870, CS 3870, CSYS 5870, or Instructor permission. Cross-listed with: CS 6870, CSYS 6870.

STAT 6990. Special Topics. 1-18 Credits.

Lectures or directed readings on advanced and contemporary topics not presently included in other statistics courses. Prerequisites: As listed in schedule of courses.

STAT 6993. Independent Study. 1-18 Credits.

A course which is tailored to fit the interests of a specific student, which occurs outside the traditional classroom/laboratory setting under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

STAT 7980. Applied Geostatistics. 3 Credits.

Introduction to the theory of regionalized variables, geostatistics (kriging techniques): special topics in multivariate analysis; Applications to real data subject to spatial variation are emphasized. Prerequisites: STAT 5230, CS 1210; or Instructor permission. Cross-listed with: CEE 7980, CSYS 7980.