STATISTICS (STAT)

Courses

STAT 200. Med Biostatistics&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. Prerequisites: STAT 111, STAT 141 or STAT 143; or STAT 211. Cross-listed with: BIOS 200.

STAT 201. Stat Computing & Data Analysis. 3 Credits.
Fundamental data processing, code development, graphing and analysis using statistical software packages, including SAS and R. Analysis of data and interpretation of results. Prerequisites: STAT 111 with Instructor permission, or STAT 141. Co-requisite: STAT 211.

STAT 211. Statistical Methods I. 3 Credits.
Fundamental concepts for data analysis and experimental design. Descriptive and inferential statistics, including classical and nonparametric methods, regression, correlation, and analysis of variance. Statistical software. Prerequisite: Junior standing. Cross-listed with: BIOS 211.

STAT 221. Statistical Methods II. 3 Credits.
Cross-listed with: BIOS 221. Multiple regression and correlation. Basic experimental design. Analysis of variance (fixed, random, and mixed models). Analysis of covariance. Computer software usage. Prerequisites: STAT 141 or STAT 143, or STAT 211.

STAT 223. Applied 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. Prerequisites: Any 200-level Statistics course; STAT 221 or STAT 225 recommended; matrix algebra recommended. Cross-listed with: BIOS 223.

STAT 224. Stats for Quality&Productivity. 3 Credits.
Statistical process control; Shewhart, cusum and other control charts; process capability studies. Total Quality Management. Acceptance, continuous, sequential sampling. Process design and improvement. Case studies. Prerequisites: STAT 141 or STAT 143, or STAT 211.

STAT 225. Applied Regression Analysis. 3 Credits.
Simple linear and multiple regression models; least squares estimates, correlation, prediction, forecasting. Problems of multicollinearity and influential data (outliers). Prerequisites: STAT 221 with computer experience or PSYC 340.

STAT 229. Survival/Logistic Regression. 3 Credits.

STAT 231. 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: STAT 211, STAT 221 recommended.

STAT 233. Survey Sampling. 3 Credits.
Design and data analysis for sample surveys. Simple random, stratified, systematic, cluster, multistage sampling. Practical issues in planning and conducting surveys. Prerequisites: STAT 211; or STAT 141 or STAT 143 with Instructor permission.

STAT 235. 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: STAT 211. Cross-listed with: BIOS 235.

STAT 237. Nonparametric Statistical Mthd. 3 Credits.
Nonparametric and distribution free methods; categorical, ordinal, and quantitative data; confidence intervals; rank and chi-square hypothesis tests; computer-intensive procedures (bootstrap, exact tests). Prerequisite: STAT 211; or STAT 141 or STAT 143 with Instructor permission.

STAT 241. Statistical Inference. 3 Credits.
Introduction to statistical theory: related probability fundamentals, derivation of statistical principles, and methodology for parameter estimation and hypothesis testing. Prerequisites: STAT 151 or STAT 153 or STAT 251, STAT 141 or equivalent, MATH 121. Cross-listed with: BIOS 241.

STAT 251. 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: MATH 121; STAT 151 or STAT 153 recommended. Cross-listed with: MATH 207, BIOS 251.

STAT 252. Appl Discr Stochas Proc Models. 1 Credit.
Markov chain models for biological, social, and behavioral systems models. Random walks, transition and steady-state probabilities, passage and recurrence times. Prerequisite: STAT 151, STAT 153, or STAT 251.

STAT 253. Appl Time Series & Forecasting. 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. Prerequisites: STAT 211 or STAT 225; or STAT 141 or STAT 143 with Instructor permission. Cross-listed with: CSYS 253.
STAT 229. Seminar in Advanced Statistics. 1 Credit.
Seminar presentations and discussions of statistical literature pertaining to the theoretical aspects of methods studied in STAT 221, STAT 223, STAT 224, STAT 225, and STAT 229, respectively. Co-requisites: STAT 221 for STAT 321; STAT 223 for STAT 323; STAT 224 for STAT 324; STAT 225 or STAT 221 for STAT 325, STAT 229 for STAT 329. STAT 241 or STAT 261 recommended.

STAT 230. Bayesian Statistics. 3 Credits.

STAT 255. Statistical Pattern Recognition. 3 Credits.
Analysis of algorithms used for feature selection, density estimation, and pattern classification, including Bayes classifiers, maximum likelihood, nearest neighbors, kernels, discriminants, neural networks and clustering. Prerequisites: STAT 241 or STAT 251, or Instructor permission. Cross-listed with: CS 355, CSYS 355.

STAT 260. 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. Prerequisites: STAT 261 and knowledge of matrix algebra or Instructor permission.

STAT 269. 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. Pre/co-requisites: STAT 223 or STAT 225; CS 016/CE 011 or permission. Cross-listed with: CSYS 369.

STAT 328. Statisticl Pattern Recognition. 3 Credits.
Analysis of algorithms used for feature selection, density estimation, and pattern classification, including Bayes classifiers, maximum likelihood, nearest neighbors, kernels, discriminants, neural networks and clustering. Prerequisites: STAT 241 or STAT 251, or Instructor permission. Cross-listed with: CS 355, CSYS 355.

STAT 329. Seminar in Advanced Statistics. 1 Credit.
Seminar presentations and discussions of statistical literature pertaining to the theoretical aspects of methods studied in STAT 221, STAT 223, STAT 224, STAT 225, and STAT 229, respectively. Co-requisites: STAT 221 for STAT 321; STAT 223 for STAT 323; STAT 224 for STAT 324; STAT 225 or STAT 221 for STAT 325, STAT 229 for STAT 329. STAT 241 or STAT 261 recommended.

STAT 330. Bayesian Statistics. 3 Credits.

STAT 355. Statistical Pattern Recognition. 3 Credits.
Analysis of algorithms used for feature selection, density estimation, and pattern classification, including Bayes classifiers, maximum likelihood, nearest neighbors, kernels, discriminants, neural networks and clustering. Prerequisites: STAT 241 or STAT 251, or Instructor permission. Cross-listed with: CS 355, CSYS 355.

STAT 360. 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. Prerequisites: STAT 261 and knowledge of matrix algebra or Instructor permission.
STAT 381. Statistical Research. 1-3 Credits.
Methodologic or data analytic research culminating in oral and written reports to the faculty. Prerequisite: Instructor Permission. Cross-listed with: BIOS 381.

STAT 385. 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 standing in Statistics or Biostatistics and permission of Statistics Program Director.

STAT 391. Master's Thesis Research. 1-6 Credits.

STAT 395. Advanced Special Topics. 1-3 Credits.
Lectures or directed readings on advanced and contemporary topics not presently included in other statistics courses. Prerequisites: As listed in course schedule. Cross-listed with: BIOS 395.