STATISTICS (STA)

STA 107. Explorations in Statistics. (3 h)
Introduction to statistical literacy and the role of statistics in settings such as elections, medicine, sports, and the sciences. Topics vary by instructor. (D, QR)

STA 111. Elementary Probability and Statistics. (4 h)
Data collection and visualization, exploratory analysis, introductory probability, inference techniques for one variable, and statistical literacy. Lab. (D, QR)

STA 175. Competitions. (1-3 h)
Seminar designed for students who wish to participate in statistics and/or data analysis competitions. Not to be counted toward any major or minor offered by the department. May be repeated for credit. Pass/Fail only.

STA 212. Statistical Models. (3 h)
A project-oriented course emphasizing data analysis, with introductions to multiple and logistic regression, model selection, design, categorical data, data visualization, and statistical programming. P-A first course in statistics, such as STA 111, ANT 380, BIO 380, BEM 201 or 202, HES 262, PSY 311 or 312, SOC 271, or POI. (D, QR)

STA 247. Design and Sampling. (3 h)
Experimental designs, observational studies, survey design and estimation with stratified, cluster, and other sampling schemes. P-STA 111 or STA 212 or POI. (D)

STA 279. Topics in Statistics. (1-3 h)
Topics in statistics not considered in regular courses, or which continue study begun in regular courses. Content varies.

STA 310. Probability. (3 h)
Distributions of discrete and continuous random variables, sampling distributions. Covers much of the material on the syllabus for the first actuarial exam. Also listed as MST 357. P-MST 112 or POI. (D)

STA 311. Statistical Inference. (3 h)
Derivation of point estimators, hypothesis testing, and confidence intervals, using both frequentist and Bayesian approaches. P-STA 310 or MST 357 or POI. (D)

STA 312. Linear Models. (3 h)
Theory of estimation and testing in linear models. Topics include least squares and the normal equations, the Gauss-Markov Theorem, testing general linear hypotheses, model selection, and applications. P-MST 121 or 205 or 206, and STA 310 or MST 357. (D)

STA 352. Networks: Models and Analysis. (3 h)
A course in fundamental network theory concepts, including measures of network structure, community detection, clustering, and network modelling and inference. Topics also draw from recent advances in the analysis of networks and network data, as well as applications in economics, sociology, biology, computer science, and other areas. Also listed as MST 359. P-MST 117 or MST 121 or MST 205 or MST 206 and one course in STA at the 200 level or above. (D)

STA 353. Probability Models. (3 h)
Introduction to probability models, Markov chains, Poisson processes and Markov decision processes. Applications will emphasize problems in business and management science. Also listed as MST 353. P-MST 111, and MST 121 or MST 205 or MST 206. (D)

STA 362. Multivariate Statistics. (3 h)
Multivariate and linear methods for classification, visualization, discrimination, and analysis of high dimensional data. P-STA 212 and one of MST 121 or MST 205 or MST 206, or POI. (D)

STA 363. Introduction to Statistical Learning. (3 h)
An introduction to supervised learning. Topics may include lasso and ridge regression, splines, generalized additive models, random forests, and support vector machines. P-STA 212 and one of MST 121 or MST 205 or MST 206, or POI, experience with statistical computing. (D)

STA 364. Computational and Nonparametric Statistics. (3 h)
Computationally intensive statistical methods. Topics include simulation, Monte Carlo integration and Markov Chain Monte Carlo, sub-sampling, and non-parametric estimation and regression. Students will make extensive use of statistical software throughout the course. P-STA 111 or STA 212, and either STA 310 or MST 357, or POI. (D)

STA 368. Time Series and Forecasting. (3 h)
Methods and models for time series processes and autocorrelated data. Topics include model diagnostics, ARMA models, spectral methods, computational considerations, and forecasting error. P-STA 212, and either STA 310 or MST 357, or POI. (D)

STA 379. Advanced Topics in Statistics. (1-3 h)
Topics in statistics not considered in regular courses or which continue study begun in regular courses. Content varies.

STA 381. Statistics Seminar. (2 h)
A senior capstone course in statistical research. Students will write and present a statistical research paper on a topic of their choosing while learning the foundations of statistical research. Topics include developing a research question and research plan, conducting literature reviews, statistical writing techniques, visualization techniques, and data ethics. By prearrangement.

STA 383. Individual Study. (1-3 h)
A course of independent study directed by a faculty adviser. By prearrangement.

STA 391. Senior Seminar Preparation. (1 h)
Independent study or research directed by a faculty adviser by prearrangement with the adviser.

STA 392. Senior Seminar Presentation. (1 h)
Preparation of a paper, followed by an oral presentation based upon work completed in STA 391.