

STATISTICS COURSES ACCEPTABLE FOR GRADUATE CREDIT FOR THE MASTER OF SCIENCE WITH A MAJOR IN MATHEMATICS

The courses in this list can be counted toward the requirements of the Master of Science in Mathematics, with a concentration in Applied Mathematics. All courses are 3 credits unless otherwise indicated.

STAT 5330G INTRODUCTION TO MATHEMATICAL STATISTICS

An introductory course intended to present a solid foundation in statistical theory, and, at the same time, to provide an indication of the relevance and importance of the theory in solving practical problems in the real world. Topics include, moments and moment-generating functions, point and interval estimation, test of statistical hypothesis, contingency tables and goodness-of-fit, nonparametric methods, and introduction to linear models. This course covers part of the material outlined in the Society of Actuaries' course 110. Prerequisite: MATH 3337 (Probability)

STAT 5531G STATISTICAL METHODS I

This is the first of a two course sequence in applied statistics. The material covered will provide an introduction to statistical concepts and terminology while focusing on descriptive and inferential methods of data analysis. Topics include descriptive statistics, parameter estimation, tests of significance, confidence intervals, analysis of variance, and simple linear regression and correlation. Both parametric and nonparametric methods are presented for the analysis of central tendency, variability, proportions, and categorical data. Prerequisites: MATH 3337 (Probability)

STAT 5532G STATISTICAL METHODS II

This is the second of a two course sequence in applied statistics. The material covered will provide an introduction to the ideas of linear models and experimental design while focusing on methods of data analysis using Regression and Analysis of Variance. Topics include multiple regression analysis, analysis of variance with multiple classification, analysis of covariance, repeated measures analysis of variance, multiple comparison techniques, and diagnostic procedures and transformations. The course is also suitable for students in business administration, economics, and the social, health and biological sciences. Prerequisites: STAT 5531 (STATISTICAL METHODS I) or, with permission of the instructor, a one semester introduction to applied statistics at the junior level or above.

STAT 7090 SELECTED TOPICS IN STATISTICS

Specialized study in a selected area of Statistics. (1 to 3 credit hours) Prerequisites: STAT 5531 (Statistical Methods I) and permission of instructor.

STAT 7130 APPLIED MULTIVARIATE STATISTICAL ANALYSIS

Estimating and inference from the Multivariate normal distribution; Hotelling's T^2 ; multivariate analysis of variance; multivariate regression; multivariate experimental design; principle component analysis; factor analysis; discriminant analysis; cluster analysis. Prerequisite: STAT 5531 (Statistical Methods I).

STAT 7132 APPLIED NONPARAMETRIC STATISTICS

Review of probability and statistical inference; binomial, quantile, and sign tests; contingency tables; methods based on ranks. Prerequisite: STAT 5531 (Statistical Methods I).

STAT 7134 APPLIED REGRESSION ANALYSIS

Simple and multiple linear regression, model selection, residual analysis, influence diagnostics, transformation of data to fit assumptions, multicollinearity, and an introduction to nonlinear regression. Prerequisite: STAT 5531 (Statistical Methods I).

STAT 7231 DESIGN OF EXPERIMENTS I

Various statistically designed experiments are introduced including randomized blocks designs, Latin squares, incomplete block designs, factorial and fractional factorial designs with and without confounding, and nested designs. Prerequisites: STAT 5531 (Statistical Methods I) or equivalent.

STAT 7232 DESIGN OF EXPERIMENTS II

Response surface methodology is introduced. First- and second-order models and designs are studied which includes determining optimum conditions and methods of estimating response surfaces. Multi-response experiments, nonlinear response surface models, and mixture designs are also studied. Prerequisite: STAT 7231 (Design of Experiments I).

STAT 7234 STATISTICAL PROCESS CONTROL

Philosophy of statistical process control is studied along with SPC tech-

niques of control charts, process-capability, designed experiments, and acceptance sampling. Prerequisite: STAT 5531 (Statistical Methods I).

STAT 7331 MATHEMATICAL STATISTICS I

Random variables, density functions, mathematical expectation, discrete and continuous distributions, moments and moment-generating functions, and limiting distributions. Prerequisites: MATH 2242 (Calculus II) and MATH 3337 (Probability).

STAT 7332 MATHEMATICAL STATISTICS II

Rigorous introduction/development of interval estimation, test of significance, comparison of k means, randomized block design, multiple comparison procedures, nonparametric test, and linear regression. The general linear model will be introduced. Prerequisite: STAT 7331 (Mathematical Statistics I).

STAT 7430 ACTUARIAL MATHEMATICS

Survival distributions and life tables; life insurance; life annuities; net premiums; multiple life functions; multiple decrement models; valuation theory for pension plans; collective risk models; population theory; theory of pension funding. Prerequisites: STAT 7331 (Mathematical Statistics I).

STAT 7432 APPLIED STOCHASTIC PROCESSES

Poisson process; renewal theory; Markov chains; Brownian motion; random walks and Martingales; stochastic order relations. Prerequisites: STAT 7331 (Mathematical Statistics I).

STAT 7434 APPLIED TIME SERIES ANALYSIS

Basic ideas of stochastic model building techniques with applications are discussed. Properties of the autocorrelation function and the spectrum of stationary processes are investigated. Models studied include the linear stationary ARMA and linear nonstationary ARIMA models along with forecasting models. Prerequisites: STAT 7331 (Mathematical Statistics I).

STAT 7436 RELIABILITY ANALYSIS

Probabilistic models for the reliability of coherent systems; statistical models for lifetimes of components and repairable systems, including the non-homogeneous Poisson process; reliability estimation and prediction; MIL standards; accelerated life testing. Prerequisites: STAT 7331 (Mathematical Statistics I).

STAT 7530 STATISTICAL COMPUTING I

Basic computer organization and computer arithmetic are investigated. Programming languages and statistical software/packages are explored. Methods for approximating cumulative distribution function and percentage points of a probability distribution are studied including nonparametric procedures. Multiple comparison procedures are also examined. Random number generation and statistical tests for testing random number generators are explored. Prerequisites: STAT 7331 (Mathematical Statistics I).

STAT 7532 STATISTICAL COMPUTING II

Various computational methods in linear algebra as applied to such statistical methods as multiple linear regression, designed experiments, multivariate analysis, and the general linear model. Further topics include computational methods for unconstrained optimization, nonlinear regression, and model fitting based on criteria other than least squares. Prerequisites: STAT 5532 (Statistical Methods II) and STAT 7331 (Mathematical Statistics I).

STAT 7890 DIRECTED STUDY IN STATISTICS

Directed study under faculty supervision. (1 to 3 credit hours) Prerequisites: Permission of Instructor and Department Chair.

STAT 7899 RESEARCH PROJECT IN STATISTICS

Research project addressed toward a real world problem. (1 to 6 credit hours) Prerequisites: Consent of project advisor and permission of Department Chair.