MASTERS IN SCIENCE IN APPLIED STATISTICS COURSES:

Foundation Courses | 21 credit hours

- STAT 58200 | Statistical Consulting and Collaboration

  This course is designed to emphasize and develop the skills needed by a statistical consultant/collaborator. Topics include: problem solving, consulting session management, written and oral communication, research ethics, design of experiments, collection of data, and application of statistical methods to real problems.

- STAT 51400 | Design of Experiments

  Fundamentals, completely randomized design; randomized complete blocks; latin square; multi-classification; factorial; nested factorial; incomplete block and fractional replications for 2n, 3n, 2m x 3n; confounding; lattice designs; general mixed factorials; split plot; analysis of variance in regression models; optimum design.

- STAT 51600 | Basic Probability and Applications

  A first course in probability, intended to serve as a background for statistics and other applications. Sample spaces and axioms of probability, discrete and continuous random variables, conditional probability and Bayes' theorem, joint and conditional probability distributions, expectations, moments and moment generating functions, law of large numbers, and central limit theorem

- OR STAT 51900 | Introduction to Probability

  Algebra of sets, sample spaces, combinatorial problems, independence, random variables, distribution functions, moment generating functions, special continuous and discrete distributions, distribution of a function of a random variable, limit theorems

- STAT 52500 | Intermediate Statistical Methodology

  Statistical methods for analyzing data based on general/generalized linear models, including linear regression, analysis of variance (ANOVA), analysis of covariance (ANCOVA), random and mixed effects models, and logistic/loglinear regression models. Application of these methods to real world problems using SAS statistical software.

- STAT 52700 | Introduction to Computing for Statistics

  This course provides a thorough introduction to the R programming language, and its use for statistical computing and data science. The course will first look at the fundamentals of R, including different data-structures, control-flow, and the basic vocabulary. An emphasis will be placed on learning idiomatic and efficient R, covering ideas such as recycling, vectorization and functional programming. The course will then look at principles and tools for tasks like organizing data ('tidy data'), manipulating data ('data carpentry'), querying data (through topics like regular expressions) as well as visualizing data (including interactive visualizations).

  OR STAT 54500 Introduction to Computational Statistics

  This introductory course covers the fundamentals of computing for statistics and data analysis. It starts with a brief overview of programming using a general purpose compiled language (C) and a statistics-oriented interpreted language (R). The course proceeds to cover data structures and algorithms that are directly relevant to statistics and data analysis and concludes with a computing-oriented introduction to selected statistical methods.

- STAT 50600 | Statistical Programming and Data Management

  Use of the SAS software system for managing statistical data. The SAS environment. Data description. Data access and management. SAS macro language and application development.

- STAT 52600 | Advanced Statistical Methodology

  This introduces some statistical modeling tools that are developed for situations where least squares regression and standard ANOVA techniques may not naturally apply. One coverage centers around two lines of models that are closely related, the generalized linear models (GLM) for regression (and ANOVA) with non Gaussian responses, and survival models for the analysis of lifetime data.

Core Courses | must have at least 9 credit hours

- STAT 51300 | Statistical Quality Control

  A strong background in control charts including adaptations, acceptance sampling for attributes and variables data, standard acceptance plans, sequential analysis, statistics of combinations, moments and probability distributions, applications

- STAT 52000 | Time Series and Applications

  A first course in stationary time series with applications in engineering, economics, and physical sciences. Stationarity, autocovariance function and spectrum; integral representation of a stationary time series and interpretation; linear filtering, transfer functions; estimation of spectrum; multivariate time series.

- STAT 52200 | Sampling and Survey Techniques

  Survey designs; simple random, stratified, and systematic samples; systems of sampling; methods of estimation; costs.

- STAT 51700 | Statistical Inference

  A basic course in statistical theory covering standard statistical methods and their application. Estimation including unbiased, maximum likelihood and moment estimation; testing hypotheses for standard distributions and contingency tables; confidence intervals and regions; introduction to nonparametric tests and linear regression.

  OR STAT 52800 Intro to Mathematical Statistics

  Distribution of mean and s^2 in normal samples, sampling distributions derived from the normal distribution, Chi square, t and F. Distribution of statistics based on ordered samples. Asymptotic sampling distributions. Introduction to multivariate normal distribution and linear models. Sufficient statistics, maximum likelihood, least squares, linear estimation, other methods of point estimation, and discussion of their properties, Cramer-Rao inequality and Rao-Blackwell theorem. Tests of statistical hypotheses, simple and composite hypotheses, likelihood ratio tests, power of tests.

Additional STAT courses appropriate for Plan of Study (3 credit hours)

- To Be Determined

GRADUATE CERTIFICATE IN APPLIED STATISTICS COURSES:

Certificate course work requires students undertake 12 credit hours from the Master's in Applied Statistics courses listed below. Student are required to take four courses in total. All courses are three credit hours each.

Required courses:

- STAT 51700 | Statistical Inference
  A basic course in statistical theory covering standard statistical methods and their application. Estimation including unbiased, maximum likelihood and moment estimation; testing hypotheses for standard distributions and contingency tables; confidence intervals and regions; introduction to nonparametric tests and linear regression.

- STAT 51600 | Basic Probability and Applications
  A first course in probability, intended to serve as a background for statistics and other applications. Sample spaces and axioms of probability, discrete and continuous random variables, conditional probability and Bayes' theorem, joint and conditional probability distributions, expectations, moments and moment generating functions, law of large numbers, and central limit theorem.

Elective courses (choose 2 of 4):

- STAT 52500 | Intermediate Statistical Methodology
  Statistical methods for analyzing data based on general/generalized linear models, including linear regression, analysis of variance (ANOVA), analysis of covariance (ANCOVA), random and mixed effects models, and logistic/loglinear regression models. Application of these methods to real world problems using SAS statistical software.

- STAT 52600 | Advanced Statistical Methodology
  This introduces some statistical modeling tools that are developed for situations where least squares regression and standard ANOVA techniques may not naturally apply. One coverage centers around two lines of models that are closely related, the generalized linear models (GLM) for regression (and ANOVA) with non Gaussian responses, and survival models for the analysis of lifetime data.

- STAT 52000 | Time Series and Applications
  A first course in stationary time series with applications in engineering, economics, and physical sciences. Stationarity, autocovariance function and spectrum; integral representation of a stationary time series and interpretation; linear filtering, transfer functions; estimation of spectrum; multivariate time series.

- STAT 51400 | Design of Experiments
  Fundamentals, completely randomized design; randomized complete blocks; latin square; multi-classification; factorial; nested factorial; incomplete block and fractional replications for 2n, 3n, 2m x 3n; confounding; lattice designs; general mixed factorials; split plot; analysis of variance in regression models; optimum design.