Statistics

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Master of Science in Statistics

The Master of Science in Statistics at Florida International University is primarily an applied statistics program. It offers a balance of statistical theory, statistical methodology, and optionally, an area application concentration. The program offers a thesis option and a non-thesis option. Regardless of the concentration or thesis option, the program requires a total of 36 credit-hours as follows: six core courses (18 hours), four elective courses or an area of concentration (12 hours), and either a thesis (6 hours) or two additional elective courses (6 hours) and a comprehensive examination.

Admission Requirements

To be admitted into the program, applicants must meet the university's graduate admission requirements (see Office of Graduate Admissions in this catalog) and the following departmental requirements:

1. Bachelor's degree in statistics, mathematics, or in a related field from an accredited university or college. A bachelor's degree in some other discipline is also acceptable provided the applicant has a suitable mathematics background.
2. A 3.0 or higher (on a 4-point scale) GPA in mathematics and statistics courses.
3. Three letters of recommendation from persons familiar with the applicant's academic qualifications.
4. International graduate student applicants whose native language is not English are required to submit a score for the Test of English as a Foreign Language (TOEFL) or for the International English Language Testing System (IELTS). A total score of 80 on the iBT TOEFL or 6.3 overall on the IELTS is required.
5. Approval of the departmental graduate committee.

Core Courses: (18)

STA 5206	Design of Experiments
STA 6244	Data Analysis I
STA 6246	Linear Models
STA 6247	Data Analysis II
STA 6326	Mathematical Statistics I
STA 6327	Mathematical Statistics II

Elective Courses: (12)

A student may select four courses from Lists A, B, and C or may opt for an area of concentration (see below).

Concentration Area: (12)

Students interested in a concentration in Biostatistics/ Environmetrics must select two courses from List A and two track-related electives. At least one of these electives must be from outside the department.

Students interested in a concentration in Reliability Analysis/Quality Control must select two courses from List B and two track-related electives. At least one of these electives must be from outside the department.

All electives must be approved by the Graduate Program Director.

List A: Biostatistics/Environmetrics

STA 5826	Stochastic Processes
STA 6176	Biostatistics
STA 6678	Environmental Statistics

List B: Reliability Analysis/Quality Control

STA 5666	Advanced Quality Control
STA 5676	Reliability Engineering
STA 5826	Stochastic Processes

List C: Elective Statistics Courses

STA 5207	Topics in Design of Experiments
STA 5236	Regression Analysis
STA 5507	Nonparametric Methods
STA 5906	Independent Study
STA 6505	Analysis of Categorical Data
STA 6807	Queueing and Statistical Models
STA 6940	Supervised Statistical Consulting
STA 7707	Multivariate Methods I
STA 7708	Multivariate Methods II

Elective Courses from Outside of the Department:

Elective courses from outside of the department must be approved by the Graduate Program Director.

Thesis Option: (6)

Students opting to write a thesis must enroll in STA 6971, Thesis Research and STA 6972, Master's Thesis (6 credit-hours total).

Non-Thesis Option: (6)

Students who opt not to write a thesis must take two additional elective courses selected from List C or from outside of the department. These courses must be approved by the Graduate Program Director.

Graduation Requirements

1. Grade and GPA requirements: a) cumulative GPA of 3.0 or higher in all courses, b) a grade of 'B' or higher in each core course, and c) a grade of 'C' or higher in each concentration or elective course.
2. A candidate who opts to write a thesis must successfully defend the thesis orally and have the written thesis approved by his/her thesis committee.
3. A candidate who chooses the non-thesis option must take and pass a comprehensive examination.

Students must follow all regulations of the University Graduate School.

Course Description

Definition of Prefixes

MAP - Mathematics/Applied. STA - Statistics.

MAP 5117 Mathematical and Statistical Modeling (3). Study of ecological, probabilistic, and various statistical models. Prerequisites: MAC 2313, COP 2210, MAS 3105; and STA 3033 or STA 3164 or STA 4322.

STA 5105L SPSS Data Analysis Lab (1). Topics include: Entering data from various sources, data checking, descriptive statistics, graphing data, crosstabulations, t-tests, correlation and regression, ANOVA, and reliability. Prerequisites: A statistics course or concurrent enrollment in a statistics course, and graduate standing or permission of the instructor.

STA 5106 Intermediate Statistics I (3). Power, measures of assoc., measurement, ANOVA: one-way and factorial, between and within subjects expected mean squares, planned comparisons, apriori contrasts, fixed, random, mixed models. This course may be of particular interest to behavioral sciences. Prerequisites: STA 3111 or STA 3123 or STA 3033; and graduate standing. (F)

STA 5107 Intermediate Statistics II (3). Correlation and regression both simple and multiple, general linear model, analysis of covariance, analysis of nominal data, analysis of categorical data. This course may be of particular interest to behavioral sciences. Prerequisite: Permission of the instructor. (S)

STA 5126/PSY 5206 Fundamentals of Design of Experiments (3). CRD and RCB designs. Latin square designs. Factorial, nested and nested-factorial experiments. Fixed, random and mixed models. Split-plot designs. Covariance analysis. Prerequisites: STA 3112 or STA 3123 or STA 3163 or STA 4322 or equivalent.

STA 5206 Design of Experiments I (3). Design and analysis of completely randomized, randomized block, Latin square, factorial, nested and related experiments. Multiple comparisons. Credit for both STA 4202 and STA 5206 will not be granted. Prerequisites: STA 3033 or STA 3164 or STA 4322 or (STA 3163 and STA 4321).

STA 5207 Topics in Design of Experiments (3). This applied course in design of experiments covers topics such as split-plot design, confounding, fractional replication, incomplete block designs, and response surface designs. Prerequisite: STA 5206.

STA 5236 Regression Analysis (3). Simple, multiple and polynomial regression, analysis of residuals, model building and other related topics. Credit for both STA 4234 and STA 5236 will not be granted. Prerequisites: STA 3112 or STA 3123 or STA 3164, or STA 6167.

STA 5446-STA 5447 Probability Theory I and II (3-3). This course is designed to acquaint the student with the basic fundamentals of probability theory. It reviews the basic foundations of probability theory, covering such topics as discrete probability spaces, random walk, Markov Chains (transition matrix and ergodic properties), strong laws of probability, convergence theorems, and law of iterated logarithm. Prerequisite: MAC 2313.

STA 5507 Nonparametric Methods (3). Distribution-free tests: sign, Mann-Whitney U, Wilcoxon signed rank, Kruskal-Wallis, Friedman, etc. Rank correlation, contingency tables and other related topics. Credit for both STA 4502 and STA 5507 will not be granted. Prerequisite: A course in statistics.

STA 5666 Advanced Statistical Quality Control (3). Review of statistical methods useful in quality improvement. Statistical process control. Taguchi's and Deming's philosophies. Control charts. Process capability analysis. Acceptance sampling plans. Prerequisities: STA 3033 or STA 3163 or STA 4321 or equivalent.

STA 5676 Reliability Engineering (3). The course material is designed to give the student a basic understanding of the statistical and mathematical techniques which are used in engineering reliability analysis. A review will be made of the basic fundamental statistical techniques required. Subjects covered include: distributions used in reliability (exponential, binomial, extreme value, etc.); tests of hypotheses of failure rates; prediction of component reliability; system reliability prediction; and reliability apportionment. Prerequisite: STA 4322.

STA 5800 Stochastic Processes for Engineers (3). Probability and conditional probability distributions of a random variable, bivariate probability distributions, multiple random variables, stationary processes, Poisson and normal processes. Prerequisites: MAC 2313, MAP 2302, STA 3033.

STA 5826 Stochastic Processes (3). This course is intended to provide the student with the basic concepts of stochastic processes, and the use of such techniques in the analysis of systems. Subjects include: Markov Processes, queueing theory, renewal processes, birth and death processes, Poisson and Normal processes. Applications to system reliability analysis, behavioral science, and natural sciences will be stressed. Prerequisite: STA 5447.

STA 5906 Independent Study (1-6). Individual conferences, assigned reading, and reports on independent investigation.

STA 6166 - STA 6167 Statistical Methods in Research I and II (3-3). For non-mathematical sciences graduate students. A non-calculus exposition of methods and applications of statistical techniques for the analysis of data. Statistical packages will be used. Prerequisite: Graduate standing. (F,S)

STA 6176 Biostatistics (3). Statistical analysis of data encountered in medical sciences. Analysis of count data, Kaplan-Meier survival analysis, Cox proportional hazards model, analysis of covariance, logistic regression, etc. Prerequisites: STA 3163 or equivalent.

STA 6196 Statistics for Environmental Sciences (3). Environmental Quality Data, Binomial, Poisson, Normal, Lognormal, and Extreme value ditributions. Prediction and Tolerance Intervals, Hypothesis Testing of Environmental Quality Data, Risk Assessment, Regrssion, Spatial Statistics. Prerequisites: STA 2122, STA 3145, STA 6166 or the equivalent.

STA 6244 Data Analysis I (3). Exploratory data analysis; testing of distributional assumptions; Chi-square tests, tests for means, variances, and proportions. Prerequisites: STA 3033, STA 4322, or STA 6327.

STA 6246 Linear Models (3). Introduction to the theory of linear models. Distribution of linear and quadratic functions of normal vectors. Development of inferential procedures for simple and other more complex linear models Prerequisites: MAS 3105, STA 6247, and STA 6327.

STA 6247 Data Analysis II (3). Analysis of variance, regression analysis. Analysis of covariance, quality control,

correlation, empirical distributions. Prerequisites: MAS 3105 and STA 6244.

STA 6326 Mathematical Statistics I (3). An introduction to the theories underlying statistical analysis. Basic concepts of probability theory, combinatorial analysis, random variables, and expectation. Prerequisite: MAC 2313.

STA 6327 Mathematical Statistics II (3). Estimation of parameters, tests of hypotheses, regression, non-parametric methods, analysis of variance, and multivariate concepts. Prerequisite: STA 6326.

STA 6505 Analysis of Categorical Data (3). Analysis of contingency tables, measures of association, logit and loglinear models. Prerequisites: STA 5107 or STA 5236 or STA 6167.

STA 6678 Environmental Stastistics (3). Review of probability theory and probability processes. Bernoulli, Poisson, and normal processes. Dilution of pollutants. Lognormal processes. Prerequisites: MAC 2312 and STA 3164.

STA 6807 Queueing and Statistical Models (3). Review of probability concepts, basic probability distributions, Poisson process, queueing models, statistical models. Prerequisites: Permission of the instructor, MAC 2312 and either STA 3033 or STA 4321.

STA 6940 Supervised Statistical Consulting (3). Formulation of statistical problems from client information, consulting session management, interpersonal aspects of consulting, problem solving techniques. Prerequisites: Permission of the instructor, STA 4102, STA 6247, and STA 6327.

STA 6971 Thesis Research (1-6). Supervised research on theoretical or applied statistics leading to a thesis. Repeatable. Prerequisite: Permission of student's program committee.

STA 6972 Master's Thesis (1-6). Thesis completion and submission in partial fulfillment of Master's degree requirements. Prerequisite: Permission of student's program committee.

STA 7707 Multivariate Methods I (3). Multivariate normal, Wishart and Hotelling's distributions. Inferences for one and two mean vectors. Profile analysis. One- and two-way MANOVA. Multivariate multiple regression. Prerequisites: STA 3112 or STA 3123. (F)

STA 7708 Multivariate Methods II (3). Principal components analysis. Factor analysis. Canonical correlation analysis. Discriminant analysis. Cluster analysis. Multidimensional scaling. Prerequisite: STA 7707. (S)