Statistics, Ph.D.

FOX SCHOOL OF BUSINESS AND MANAGEMENT (http://www.fox.temple.edu)

About the Program

The primary purpose of the Ph.D. program in Statistics is to prepare statisticians for professional roles in research and application of statistics, operations research, or biostatistics. This activity may take place in academic, business, or government settings. The distinguishing characteristic of the Ph.D. program is its research dissertation. Consequently, a student entering the post-master's part of the program (i.e., becoming a doctoral student) must expect to embark on a more intense phase of preparation in the theory, methods, and application of statistics. In short, the doctoral program is designed for able students who are willing to undertake a program of advanced study and research.

Time Limit for Degree Completion: 7 years

Campus Location: Main

Full-Time/Part-Time Status: Students complete the degree program through classes offered before 4:30 p.m. The degree program can be completed on a full- or part-time basis.

Interdisciplinary Study: The program encourages interdisciplinary coursework, research, and interactions among faculty and students with interests in business, biology, and health sciences.

Areas of Specialization: Faculty members specialize and offer substantial coursework in:

- Applications of statistics to the law
- Asymptotic theory
- Bayesian inference
- Clinical trials
- Design of experiments
- Inequalities in statistics
- Linear and generalized linear models
- Methods in AIDS research and teratology
- Multiple comparisons
- Multivariate analysis
- Parametric and nonparametric inference
- Pharmaceutical statistics
- Quality control
- Ranking and selection
- Resampling methods
- Robust inference
- Statistical computing and graphics
- Survey sampling
- Survival analysis
- Time series

Job Prospects: The program is dedicated to producing well-trained statisticians who work as researchers in academia, industry, and government. In recent years, more than half of our Ph.D. recipients found employment as statisticians in the pharmaceutical industry or in medical research organizations.

Non-Matriculated Student Policy: Qualified non-matriculated students are permitted to take doctoral courses.

Financing Opportunities: The principal duties of a Teaching Assistant include teaching, assisting faculty members in the classroom, and grading. An assistantship provides a stipend and tuition remission.

Admission Requirements and Deadlines

Application Deadline:

Fall: January 15; December 15 international
Applications for the Ph.D. program are all processed together after the deadline. International students who miss the December 15 deadline are required to submit to Temple University an evaluation of their transcript(s) by an approved educational evaluation firm.

APPLY ONLINE (http://fox.force.com/SiteLogin) to this Fox graduate program at http://fox.force.com/SiteLogin.

Letters of Reference:
Number Required: 2
From Whom: Letters of recommendation should be obtained from college/university faculty members familiar with the applicant's academic competence.

Coursework Required for Admission Consideration: Applicants must have completed coursework in Differential and Integral Calculus, including Multivariable Calculus, as well as a course in Linear Algebra.

Master's Degree in Discipline/Related Discipline: A master's degree is not required.

Bachelor's Degree in Discipline/Related Discipline: All applicants must present credentials that are the equivalent of the appropriate baccalaureate degree at Temple University.

Statement of Goals: A statement of goals is required.

Standardized Test Scores:
GRE: Required. Successful applicants typically possess elite level scores on the quantitative section of the GRE.

TOEFL: 100 iBT or 600 PBT minimum

Resume: Current resume required.

Program Requirements

General Program Requirements:
Number of Didactic Credits Required Beyond the Baccalaureate: 48

Required Courses:

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<tr>
<td>STAT 8001</td>
<td>Probability and Statistics Theory I</td>
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<td>STAT 8002</td>
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<td>STAT 8003</td>
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<td>STAT 8004</td>
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<td>STAT 9001</td>
<td>Advanced Statistical Inference I</td>
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<td>STAT 9002</td>
<td>Advanced Statistical Inference II</td>
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<td>At least two additional 9000-level courses</td>
<td>6</td>
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<tr>
<td>Additional coursework in Statistics and electives, including courses taken outside Statistics with prior approval of the Director of Graduate Programs in Statistics</td>
<td>24</td>
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Total Credit Hours 48

Additional Requirements: An additional requirement is completion of a Summer research paper.

Culminating Events:
Statistics Competency Examination:
An assessment of the students' proficiency in statistical theory and methodology is made at the end of their first year in the program with an exam offered in June. Students who fail the statistics competency examination on the first attempt must sit for reexamination prior to the Fall term of their second year. A second failure results in dismissal from the University. No third attempt is allowed.

Preliminary Examination:
The purpose of the preliminary examination is to demonstrate critical and interpretive knowledge of current research. The subject areas are determined, in advance, by the faculty of the department. The preliminary exam should be completed no more than one term after the student completes the coursework component of the program. Students who are preparing to write their preliminary examinations should confirm a time and date with their departmental advisor.

The members of the student's department write the questions for the preliminary exam. The student must answer every question on the examination in order to be evaluated by the Department Committee. The evaluators look for a breadth and depth of understanding of specific research areas; a critical application of that knowledge to specific phenomena; and an ability to write technical prose. Each member votes to pass or fail the student. In order to pass, a majority of the committee members must agree that the exam has been satisfactorily completed.

Proposal:
The dissertation proposal demonstrates the student's knowledge of and ability to conduct the proposed research. The proposal should consist of the following:

1. the context and background surrounding a particular research problem;
2. an exhaustive survey and review of literature related to the problem; and
3. a detailed methodological plan for investigating the problem.

The proposal should be completed and approved no more than one year after completing coursework. Upon approval, a timeline for completing the investigation and writing process is established.

Dissertation:
The doctoral dissertation is an original empirical study that makes a significant contribution to the field. It should expand the existing knowledge and demonstrate the student's knowledge of both research methods and a mastery of her/his primary area of interest. Dissertations should be rigorously investigated; uphold the ethics and standard of the field; demonstrate an understanding of the relationship between the primary area of interest and the broader field of business; and be prepared for publication in an academic journal.

The Doctoral Advisory Committee is formed to oversee the student's doctoral research and is comprised of at least three Graduate Faculty members. Two members, including the Chair, must be from the student's department. The Chair is responsible for overseeing and guiding the student's progress, coordinating the responses of the committee members, and informing the student of her/his academic progress.

The Dissertation Examining Committee evaluates the student's dissertation and oral defense, including the student's ability to express verbally her/his research question, methodological approach, primary findings, and implications. The Dissertation Examining Committee votes to pass or fail the dissertation and the defense at the conclusion of the public presentation. This committee is comprised of the Doctoral Advisory Committee and at least one additional faculty member from outside the department.

If any member decides to withdraw from the committee, the student shall notify the Chair of the Dissertation Examining Committee and the Director of Graduate Programs in Statistics. The student is responsible for finding a replacement, in consultation with the Chair. Inability to find a replacement shall constitute evidence that the student is unable to complete the dissertation. In such a case, the student may petition the Director of Graduate Programs in Statistics for a review. Once review of the facts and circumstances is completed, the Director will rule on the student's progress. If the Director rules that the student is not capable of completing the dissertation, s/he will be dismissed from the program. This decision may be appealed to the Senior Associate Dean. If dismissed, the student may appeal to the Graduate School.

Students who are preparing to defend their dissertation should confirm a time and date with their Dissertation Examining Committee and register with the Graduate Secretary at least 15 days before the defense is to be scheduled. The Graduate Secretary arranges the time, date, and room within two working days, and forwards to the student the appropriate forms. After the Graduate Secretary has arranged the time, date, and room for the defense, the student must send to the Graduate School a completed “Announcement of Oral Defense” form, found at http://www.temple.edu/grad/forms/ , at least 10 days before the defense. The department posts flyers announcing the defense, and the Graduate School announces the defense on its website.

Contacts

Program Web Address:
http://www.fox.temple.edu/cms_academics/phd/statistics/

Department Information:
Fox School of Business and Management
1801 Liacouras Walk
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Philadelphia, PA 19122
foxpathdoffice@temple.edu
215-204-7677
Fax: 215-204-5698

Submission Address for Application Materials:
http://fox.force.com/SiteLogin

Department Contacts:
Associate Director, Doctoral Programs:
Lisa Fitch
A336 Alter Hall
foxpathdoffice@temple.edu
215-204-7677
Director of Graduate Programs in Statistics:
Dr. Robert Krafty
336 Speakman Hall
krafty@temple.edu
215-204-3163

Courses

STAT 5001. Quantitative Methods for Business. 1 to 3 Credit Hour.
This course is designed to introduce you to contemporary elementary applied statistics and to provide you with an appreciation for the uses of statistics in business, economics, everyday life, as well as hands-on capabilities needed in your later coursework and professional employment.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School
Repeatability: This course may not be repeated for additional credits.

STAT 5002. Introduction to Biostatistics. 3 Credit Hours.
Topics cover statistical methods and concepts with special emphasis on applications in health and biological sciences.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits.

STAT 5170. Special Topics. 1 to 6 Credit Hour.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may be repeated for additional credit.

STAT 5182. Independent Study. 1 to 3 Credit Hour.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may be repeated for additional credit.

STAT 5190. Special Topics - Stat. 1 to 6 Credit Hour.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may be repeated for additional credit.

STAT 5282. Independent Study. 1 to 3 Credit Hour.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may be repeated for additional credit.
Pre-requisites: STAT 5001|Minimum Grade of B-|May not be taken concurrently.

STAT 5301. Foundations for Data Analytics. 1.5 Credit Hour.
Statistical analytics provide a competitive edge to organizations by extracting information from data and helping understand risky and random events. Statistical analytics are an important part of the decision making process, allowing managers to make informed strategic decisions that combine executive intuition with a thorough understanding of data. Using statistical methods to extract information from data, and providing an indication of the quality of that information, adds value to an organization’s strategic decision making process. This course is designed to develop strong skills in data analysis, modeling, and decision making under uncertainty. It is designed to train students to use valid inferences from data and make informed decisions. The topics covered in the course include data visualization, descriptive statistics, estimation, hypothesis testing, and regression analysis. This course emphasizes the applications of statistical analytic techniques through lectures, case analysis and computer exercises. Computations are facilitated using Excel, and students are expected to interpret and translate statistical results into a language understood by a non-technical audience.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School
Co-requisites: MIS 5301
Repeatability: This course may not be repeated for additional credits.
STAT 5401. Foundations for Data Analytics. 1.5 Credit Hour.
Statistical analytics provide a competitive edge to organizations by extracting information from data and helping understand risky and random events. Statistical analytics are an important part of the decision making process, allowing managers to make informed strategic decisions that combine executive intuition with a thorough understanding of data. Using statistical methods to extract information from data, and providing an indication of the quality of that information, adds value to an organization’s strategic decision making process. This course is designed to develop strong skills in data analysis, modeling, and decision making under uncertainty. It is designed to train students to use valid inferences from data and make informed decisions. The topics covered in the course include data visualization, descriptive statistics, estimation, hypothesis testing, and regression analysis. This course emphasizes the applications of statistical analytic techniques through lectures, case analysis and computer exercises. Computations are facilitated using Excel, and students are expected to interpret and translate statistical results into a language understood by a non-technical audience.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School
Co-requisites: MIS 5401
Repeatability: This course may not be repeated for additional credits.

STAT 5801. Statistical Analysis for Management. 3 Credit Hours.
In this course, you'll learn how to use statistics to help solve business problems throughout an enterprise. You'll examine case examples of statistical analysis in areas such as marketing, finance and management. You'll learn descriptive and inferential techniques such as regression analysis and how to analyze data and reach decisions, using statistical computer software and Excel.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits.

STAT 5802. Quantitative Techniques for Management. 3 Credit Hours.
In this course you'll apply advanced quantitative techniques for managerial decision-making such as forecasting, linear programming, simulation, decision analysis, Markov chains and game theory. You'll use customized software and Excel to analyze these models extensively and apply them to decisions regarding resource allocation and other managerial problems.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits.

STAT 5890. Special Topics. 1 to 6 Credit Hour.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may be repeated for additional credit.

STAT 8001. Probability and Statistics Theory I. 3 Credit Hours.
Topics include basic probability theory and combinatorial problems, generating functions, random variables, probability distributions, law of large numbers, and limit theorems.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits

Pre-requisites:
(STAT 8001|Minimum Grade of B-|May not be taken concurrently
AND STAT 8002|Minimum Grade of B-|May not be taken concurrently).

STAT 8003. Statistical Methods I. 3 Credit Hours.
Introduction to applied statistics. Topics include data management, probability distributions, parameter estimation, hypothesis testing, sampling methodologies, graphical display, analysis of variance, and simple and multiple regression. Use of R, S-Plus and SAS statistical software.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits

Pre-requisites:
MATH 2031|Minimum Grade of B-|May not be taken concurrently.

STAT 8004. Statistical Methods II. 3 Credit Hours.
Design of experiments, analysis of discrete data, introduction to nonparametric methods, logistic regression, ARIMA time series analysis, bootstrapping, jackknife, robustness, and selected topics in multivariate analysis. Use of R, S-Plus and SAS statistical software.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits

Pre-requisites:
STAT 8003|Minimum Grade of B-|May not be taken concurrently.
STAT 8031. Probability and Large Sample Theory. 3 Credit Hours.
An advanced level theoretical course covering measure theoretic probability, some probability inequalities, statistical independence, strong and weak laws of large numbers, convergence in distribution, variance stabilizing transformations, characteristic functions and central limit theorem.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits
Pre-requisites:
STAT 8001|Minimum Grade of B|May not be taken concurrently.

STAT 8101. Stochastic Processes. 3 Credit Hours.
This is a first course in stochastic processes, with an emphasis on continuous-time models that support applications in financial mathematics and derivative evaluation. The course covers: fundamentals of probability, limit theorems, conditional expectation, change of measures, Markov chains, random walks, martingales, Brownian motion, the Ito integral, stochastic differential equations, the Black-Scholes model and its use in evaluating a variety of financial derivatives.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits
Pre-requisites:
MATH 1031|Minimum Grade of B-|May not be taken concurrently
OR MATH 1931|Minimum Grade of B-|May not be taken concurrently
OR MATH 1041|Minimum Grade of B-|May not be taken concurrently
OR MATH 1941|Minimum Grade of B-|May not be taken concurrently
OR MATH 1042|Minimum Grade of B-|May not be taken concurrently
OR MATH 1942|Minimum Grade of B-|May not be taken concurrently.

STAT 8102. Statistical Methods III. 3 Credit Hours.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits
Pre-requisites:
STAT 8004|Minimum Grade of B-|May not be taken concurrently.

STAT 8103. Sampling Theory. 3 Credit Hours.
Theory and application of sampling from finite populations. Topics include random, stratified, cluster, and systematic sampling; estimation of means and variances; optimal allocation of resources; problems of nonsampling errors; and ratio and regression estimation.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits
Pre-requisites:
STAT 8003|Minimum Grade of B-|May not be taken concurrently.

STAT 8104. Mathematics for Stat. 3 Credit Hours.
Vector spaces; linear independence of vectors and basis; matrices and algebraic operations on matrices; determinants; rank of a matrix; inverse of nonsingular matrices; linear equations and their solutions; generalized inverse of a matrix; eigen values and vectors of matrices; diagonalization theorems; quadratic forms and their reduction to sum of squares; Jacobians.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits
Pre-requisites:
MATH 2101|Minimum Grade of B-|May not be taken concurrently
OR MATH 2103|Minimum Grade of B-|May not be taken concurrently.

STAT 8105. Time Series Analysis I. 3 Credit Hours.
Theory and application of univariate time series analysis. Includes both time domain and frequency domain methods. Considers stationary and nonstationary linear processes, time series model building, forecasting, unit root test, intervention models and outlier detection, spectral theory of stationary processes, spectral windows, and estimation of spectrum.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits
Pre-requisites:
STAT 8002|Minimum Grade of B-|May not be taken concurrently.
STAT 8106. Linear Models I. 3 Credit Hours.
Covers the basic theory and practice of generalized linear models (GLM), such as the logistic, Poisson and gamma regression, as well as models for multilevel or longitudinal Gaussian responses, such as the hierarchical linear model and linear mixed model. The students will need to work with R and SAS throughout the semester.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits
Pre-requisites:
(STAT 8002|Minimum Grade of B-|May not be taken concurrently)
AND (STAT 8004|Minimum Grade of B-|May not be taken concurrently)
AND (STAT 8104|Minimum Grade of B-|May not be taken concurrently).

STAT 8107. Design of Experiments I. 3 Credit Hours.
Principles of experimental designs, completely randomized designs, multiple comparisons, randomized block design, latin square design, missing value problems, analysis of covariance, and factorial experiments.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits
Pre-requisites:
STAT 8004|Minimum Grade of B-|May not be taken concurrently.

STAT 8108. Applied Multivariate Analysis I. 3 Credit Hours.
Multivariate normal distribution; marginal and conditional distributions; estimation of population mean vector and dispersion matrix; correlation, partial correlation, and multiple correlation coefficients; Hotelling’s T2; MANOVA; discriminant function; repeated measurements analysis; principal components and canonical correlation; factor analysis; and multidimensional scaling.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits
Pre-requisites:
(STAT 8004|Minimum Grade of B-|May not be taken concurrently)
AND (STAT 8104|Minimum Grade of B-|May not be taken concurrently).

STAT 8109. Regression, Time Series, and Forecasting for Business Applications. 3 Credit Hours.
Intermediate level course that covers regression analysis, time series analysis, and forecasting. The course is application oriented and standard statistical packages such as MINITAB are introduced and extensively used.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits
Pre-requisites:
STAT 8001|Minimum Grade of B-|May not be taken concurrently.

STAT 8111. Survey Techniques for Business Applications. 3 Credit Hours.
Application oriented. A course dealing with statistical and nonstatistical aspects of organizing a sample survey. Included are discussions of objectives, measurement, sample selection, pilot testing, data collection, data editing, summarization and interpretation of results in addition to describing the various sampling schemes. Students may be required to plan and execute a survey.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits
Pre-requisites:
STAT 8001|Minimum Grade of B-|May not be taken concurrently.

STAT 8112. Statistical Methods for Business Research I. 3 Credit Hours.
Part I of a doctoral level, one-year sequence of courses for the PhD students in Business Administration program. The course covers a variety of statistical methods useful in business research, such as: multiple regression analysis, ANOVA, linear models, analysis of covariance, logistic regression, principal component analysis, exploratory factor analysis and canonical correlation analysis. Emphases are placed on rationales, assumptions, techniques, and interpretation of results from computer packages. Relevant mathematical results will be presented, but proofs or abstract arguments shall be avoided. The lectures cover computer usages, such as R and/or SAS, and the students are expected to work with SAS (or equivalent packages) throughout the semester.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits
Pre-requisites:
STAT 2101|Minimum Grade of B-|May not be taken concurrently
OR STAT 2901|Minimum Grade of B-|May not be taken concurrently
OR STAT 2103|Minimum Grade of B-|May not be taken concurrently
OR STAT 2903|Minimum Grade of B-|May not be taken concurrently
OR MATH 2031|Minimum Grade of B-|May not be taken concurrently
OR MATH 3032|Minimum Grade of B-|May not be taken concurrently.
STAT 8113. Statistical Methods for Business Research II. 3 Credit Hours.
Part II of a doctoral level, one-year sequence of courses for the PhD students in Business Administration program. Topics covered in this course are:
discriminant analysis, confirmatory factor analysis and structural equations modeling, time-series intervention analysis, survival (event history) analysis,
MANOVA, multivariate profile analysis, hierarchical linear models (HLM), linear mixed models (LMM) for multilevel data.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits
Pre-requisites:
STAT 8112|Minimum Grade of B-|May not be taken concurrently.

STAT 8114. Survival Analysis I. 3 Credit Hours.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits

STAT 8115. Nonparametric Methods. 3 Credit Hours.
A thorough course in nonparametric statistics. Estimation and testing of hypothesis when the function form of the population distribution function is not
completely specified.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits
Pre-requisites:
STAT 8002|Minimum Grade of B-|May not be taken concurrently.

STAT 8116. Categorical Data Analysis. 3 Credit Hours.
Sampling models and analyses for discrete data: Fisher's exact test; Logistic regression; ROC analysis; Log-linear models and Poisson regression;
Conditional logistic regression; Cochran-Mantel-Haenzzel test; Measures of agreement between observers; Quasi-independence; Multinomial logit
models; Proportional odds model; Association models; generalized estimating equations (GEE); generalized linear mixed model (GLIMMIX); GSK
models; Composite link functions. The students will need to work with R and SAS throughout the semester.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits
Pre-requisites:
STAT 8002|Minimum Grade of B-|May not be taken concurrently.

STAT 8117. Clinical Trials. 3 Credit Hours.
Introduction to the special problems associated with medical trials on humans. Topics include randomization, sample-size determination, methods for
early trial termination, and tests for superiority, equivalence, and non-inferiority. Also discussed are choice of endpoints, control, side effects, use of
historical data, meta-analysis and ethics of experimentation on humans.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits
Pre-requisites:
STAT 8002|Minimum Grade of B-|May not be taken concurrently
OR STAT 8004|Minimum Grade of B-|May not be taken concurrently.

STAT 8121. Statistical Computing. 3 Credit Hours.
Use of computers in the solution of statistical problems. Topics include: floating point architecture, random number generation, design of statistical
software, computational linear algebra, numerical integration, optimization methods.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits
Pre-requisites:
STAT 8004|Minimum Grade of B-|May not be taken concurrently.

STAT 8122. Advanced SAS Programming. 3 Credit Hours.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits
Pre-requisites:
(MATH 1042|Minimum Grade of B-|May not be taken concurrently
OR MATH 1942|Minimum Grade of B-|May not be taken concurrently)
AND (STAT 8001|Minimum Grade of B-|May not be taken concurrently)
AND (STAT 8002|Minimum Grade of B-|May not be taken concurrently).

STAT 8123. Time Series Analysis and Forecasting. 3 Credit Hours.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits
Pre-requisites:
(STAT 8002|Minimum Grade of B-|May not be taken concurrently
OR STAT 8101|Minimum Grade of B-|May not be taken concurrently)
AND (ECON 8009|Minimum Grade of B-|May not be taken concurrently
OR MATH 3032|Minimum Grade of B-|May not be taken concurrently).
STAT 9001. Advanced Statistical Inference I. 3 Credit Hours.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits
Pre-requisites:
(MATH 1042|Minimum Grade of B-|May not be taken concurrently)
OR MATH 1942|Minimum Grade of B-|May not be taken concurrently)
AND (STAT 8001|Minimum Grade of B-|May not be taken concurrently)
AND (STAT 8002|Minimum Grade of B-|May not be taken concurrently).

STAT 9002. Advanced Statistical Inference II. 3 Credit Hours.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits.

STAT 9090. Special Topics. 1 to 6 Credit Hour.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School
Repeatability: This course may be repeated for additional credit.

STAT 9101. Time Series Analysis II. 3 Credit Hours.
Theory and application of multiple time series analysis and special topics. Covers transfer function models, time series regression with autocorrelated errors, ARCH and GARCH models, vector time series models, cointegration, state space models, long memory processes and nonlinear processes, time series aggregation and disaggregation.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits
Pre-requisites:
STAT 8105|Minimum Grade of B-|May not be taken concurrently.

STAT 9103. Stat Lrng & Data Mining. 3 Credit Hours.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits
Pre-requisites:
(STAT 8001|Minimum Grade of B-|May not be taken concurrently)
AND (STAT 8002|Minimum Grade of B-|May not be taken concurrently)
AND (STAT 8003|Minimum Grade of B-|May not be taken concurrently)
AND (STAT 8004|Minimum Grade of B-|May not be taken concurrently).

STAT 9106. Linear Models II. 3 Credit Hours.
Continuation of Stat 8106, covers the theory and practice of analyzing multivariate repeated/correlated non-Gaussian responses, with or without missing observations. Missing at random (MAR) models; informative missingness; EM algorithm; multiple imputations; quasi-likelihood estimation; generalized estimating equations (GEE); transition models; Gibbs sampling; Markov Chain Monte-Carlo (MCMC) technique. The students will need to work with R, SAS and WinBugs throughout the semester.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits
Pre-requisites:
STAT 8106|Minimum Grade of B-|May not be taken concurrently.

STAT 9107. Design of Experiments II. 3 Credit Hours.
Covers symmetric and asymmetrical factorial experiments, fractional replication, split plot design, balanced and partially balanced incomplete block designs without and with recovery of interblock information and lattice designs.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits
Pre-requisites:
STAT 8107|Minimum Grade of B-|May not be taken concurrently.

STAT 9108. Multivariate Analysis II. 3 Credit Hours.
A study of specialized topics in multivariate analysis.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits
Pre-requisites:
(STAT 8002|Minimum Grade of B-|May not be taken concurrently)
AND (STAT 8108|Minimum Grade of B-|May not be taken concurrently).
STAT 9114. Survival Analysis II. 3 Credit Hours.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits
Pre-requisites:
STAT 8114|Minimum Grade of B-|May not be taken concurrently.

STAT 9116. Statistical Genetics: An Advanced Graduate Course. 3 Credit Hours.
An advanced level graduate course in statistical genetics covering the basic concepts of allele, gene, genotype, phenotype, Hardy-Weinberg equilibrium, linkage analysis, QTL mapping using marker analysis, functional mapping for longitudinal traits, analysis of ultra-high dimensional data, genome-wide association studies.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may not be repeated for additional credits
Pre-requisites:
(STAT 8001|Minimum Grade of B|May not be taken concurrently)
AND (STAT 8002|Minimum Grade of B|May not be taken concurrently)
AND (STAT 8003|Minimum Grade of B|May not be taken concurrently)
AND (STAT 8004|Minimum Grade of B|May not be taken concurrently).

STAT 9180. Seminar in New Topics in Statistics. 3 Credit Hours.
Special topics in Statistics.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may be repeated for additional credit.

STAT 9183. Directed Study in Statistics. 1 to 6 Credit Hour.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may be repeated for additional credit.

STAT 9190. Seminar in New Topics in Statistics. 3 Credit Hours.
Special topics in Statistics.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may be repeated for additional credit.

STAT 9994. Preliminary Examination Preparation. 1 Credit Hour.
Preparation for preliminary examinations.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Repeatability: This course may be repeated for additional credit.

STAT 9998. Pre-Dissertation Research. 1 Credit Hour.
Proposal design. Registration required until approved proposal is on file at the Graduate School.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Student Attribute restrictions: Must be enrolled in one of the following Student Attributes: Dissertation Writing Student
Repeatability: This course may be repeated for additional credit.

STAT 9999. Dissertation Research. 1 to 12 Credit Hour.
For students elevated to candidacy and doing their dissertation research. Registration required until successful defense and graduation.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
Student Attribute restrictions: Must be enrolled in one of the following Student Attributes: Dissertation Writing Student
Repeatability: This course may be repeated for additional credit.