

Statistics

Department Information

- **Department Chair:**
Rhonda Magel, Ph.D.
- **Department Location:**
221 Morrill Hall
- **Department Phone:**
(701) 231-7177
- **Department Email:**
ndsu.stats@ndsu.edu
- **Department Web Site:**
www.ndsu.edu/statistics/ (<http://www.ndsu.edu/statistics/>)
- **Application Deadline:**
Application deadline is March 15 for international students and applicants who would like an opportunity for an assistantship if available.
- **Credential Offered:**
Ph.D., M.S., Certificate
- **Test Requirement:**
GRE (recommended)
- **English Proficiency Requirements:**
TOEFL ibt 79; IELTS 6.5; Duolingo 105

Program Description

The Department of Statistics offers programs leading to a Ph.D. in statistics, a M.S. degree in applied statistics. The program is flexible enough to be individually planned around prior experience and in accord with professional goals.

During the first year of the program, master's and doctoral students are strongly encouraged to meet with each faculty member to discuss possible research topics. The student should select an advisory and examining committee by the end of the first year.

A joint master's degree in computer science and statistics may also be obtained. Graduate certificates in Statistics for non-majors and Big Data Applied Statistics Analysis are also available.

Graduate Certificate

- B.S. or equivalent degree from an accredited university,
- Knowledge of College Algebra

Master's Program in Applied Statistics

In addition to the Graduate School requirements (<http://catalog.ndsu.edu/past-bulletin-archive/2021-22/graduate/admission-information/>), the applicant must:

- Have had at least one year of calculus,
- Have had at least one course in statistics, and
- Have had at least one programming language

Joint Master's Program in Computer Science and Statistics

To be admitted with full status into the M.S. program in computer science and statistics, the applicant must satisfy the admission requirements for both the M.S. program in computer science and the M.S. program in applied statistics.

Ph.D. Program in Statistics

In addition to the Graduate School requirements, the applicant must:

- Have an M.S. degree in statistics or related area

Students not holding a master's degree in statistics or a closely related field will not be admitted to the Ph.D. program in statistics. These students must first apply to the M.S. program in applied statistics and complete the M.S. degree.

Ph.D. Program in Statistics (with Emphasis in Sports Statistics)

In addition to the Graduate School requirements, the applicant must:

- Have an M.S. degree in statistics or related area and some knowledge or interest in sports

Financial Assistance

Teaching assistantships are available. To be considered for an assistantship, the application must be complete with the Graduate School no later than March 15.

Statistics Certificate (for non-majors)

The graduate certificate requires 12 semester credit hours consisting of graduate level courses in statistics. STAT 725 needs to be the first course taken for students with little or no prior knowledge of statistics. No credit will be given for STAT 725 for the certificate if it is not the first course taken. Students in the certificate program should not take both STAT 661 and STAT 726. STAT 726 is recommended. Also, students in this program should not take both STAT 670 and STAT 671. After completing the requirements for the certificate, please contact the Department of Statistics to verify completion.

Big Data Applied Statistics Analysis Certificate

This certificate serves graduate students and working professionals by providing summer online coursework in Big Data Applied Statistics Analysis. Analytics professionals are in demand in this era of big data. Students will learn how to visualize and use statistical learning algorithms to explore big data.

Code	Title	Credits
STAT 712	Applied Statistical Machine Learning	3
STAT 711	Basic Computational Statistics using R	3
STAT 713	Introduction to Data Science	3
STAT 714	Statistical Big Data Visualization	3
Total Credits		12

Master of Science in Applied Statistics

The program for the M.S. degree in applied statistics requires 32 semester credits with an overall GPA of 3.0 or higher. An oral defense of a research-based thesis or paper is required.

Code	Title	Credits
Complete a set of core courses* with a grade of B or better, including		
STAT 661	Applied Regression Models	3
STAT 662	Introduction to Experimental Design	3
STAT 764 or STAT 774	Multivariate Methods Generalized Linear Models	3
STAT 767	Probability and Mathematical Statistics I	3
STAT 768	Probability and Mathematical Statistics II	3
Successfully complete two 1-credit practicums in consulting. Each statistical practicum will be listed as STAT 794		2
Complete an additional 9-12 hours (depends on number of research hours) of course work selected from the following courses:		9-12
STAT 660	Applied Survey Sampling	
STAT 663	Nonparametric Statistics	
STAT 664	Discrete Data Analysis	
STAT 669	Introduction to Biostatistics	
STAT 670	Statistical SAS Programming	
STAT 671	Introduction to the R Language	
STAT 672	Time Series	

STAT 673	Actuarial Statistical Risk Analysis
STAT 677	Introductory Survival and Risk Analysis I
STAT 678	Introductory Survival and Risk Analysis II
STAT 730	Biostatistics
STAT 732	Introduction to Bioinformatics
STAT 770	Survival Analysis
STAT 775	Using Statistics in Sports
STAT 786	Advanced Inference
STAT 796	Special Topics
STAT 851	Bayesian Statistical Inference
STAT 859	Applied Spatial Statistics
STAT 798 or STAT 797	Master's Thesis Master's Paper

Must have 15 hours of 700-800 level courses.

*If one of these courses has been taken at the undergraduate level, another graduate level course should be substituted. STAT 725 Applied Statistics and STAT 726 Applied Regression and Analysis of Variance will not be counted for this degree program.

- A plan of study must be submitted at least one semester prior to graduation.
- Pass a written comprehensive exam. This exam consists of two sections. Exam 1 covers STAT 767 Probability and Mathematical Statistics I and STAT 768 Probability and Mathematical Statistics II. Exam 2 covers STAT 661 Applied Regression Models, STAT 662 Introduction to Experimental Design and STAT 764 Multivariate Methods or STAT 774 Generalized Linear Models. Exam 1 is two hours and Exam 2 is three hours. These exams are offered during approximately the fifth week of each semester. A maximum of two attempts is allowed.
- Complete and successfully defend the research thesis or paper.

M.S. Degree in Computer Science and Statistics

Code	Title	Credits
Statistics Courses		
STAT 661	Applied Regression Models	3
STAT 671	Introduction to the R Language	3
STAT 669	Introduction to Biostatistics	3
STAT 772	Computational Statistics	3
STAT 732	Introduction to Bioinformatics	3
One additional graduate course in statistics, not including STAT 725 Applied Statistics or STAT 726 Applied Regression and Analysis of Variance		
Computer Science Courses		
CSCI 713	Software Development Processes	3
CSCI 724	Survey of Artificial Intelligence	3
CSCI 732	Introduction To Bioinformatics	3
CSCI 765	Introduction To Database Systems	3
Two additional graduate level courses in computer science.		
Master's Thesis or Master's Paper Research Credits		
Total Credits		42

Ph.D. Degree in Statistics

The program for the Ph.D. degree requires an additional 30 credits of course work beyond the M.S. degree and 30 hours of research. An oral defense of a dissertation is required. All students entering program must have an M.S. degree in statistics or closely related field. Any core course (or similar course) required for the M.S. degree that has not been taken before entering the Ph.D. program, must be taken before obtaining the Ph.D. degree. This may require additional course work beyond the 30 credits depending on the area in which the M.S. degree was obtained.

Successfully complete two 1-credit practicums in Consulting/Presentation Practicum. Each statistical practicum will be listed as **STAT 794** Practicum/Internship

Complete at least 30 semester credits of statistics courses at the 600- to 800-level (does not include STAT 725 Applied Statistics STAT 726 Applied Regression and Analysis of Variance). At least 15 credits must be at the 700- to 800-level. Students must take STAT 786 Advanced Inference, STAT 764 Multivariate Methods and STAT 774 Generalized Linear Models if not taken at the M.S. level.

Upon approval by the adviser and advisory committee, up to 9 hours may be taken in Mathematics or Computer Science. It is recommended that a student have knowledge of real analysis at some level such as MATH 650 Real Analysis I.

- A plan of study must be submitted at least one semester prior to graduation.
- Pass a written comprehensive exam. This exam consists of two sections. Exam 1 covers STAT 767 and STAT 768. Exam 2 covers STAT 661, STAT 662 and STAT 764 or STAT 774. Exam 1 is two hours and Exam 2 is three hours. These exams are offered during approximately the fifth week of each semester. A maximum of two attempts is allowed.
- Submit a research proposal and pass an oral exam on the proposal and related topics.
- Complete and successfully defend the research dissertation.

Code	Title	Credits
Core Courses		
STAT 661	Applied Regression Models	3
STAT 662	Introduction to Experimental Design	3
STAT 764 or STAT 774	Multivariate Methods Generalized Linear Models	3
STAT 767	Probability and Mathematical Statistics I	3
STAT 768	Probability and Mathematical Statistics II	3
Additional statistics courses, not including STAT 725 or STAT 726		30
If not taken at the M.S. level, student must take STAT 764, STAT 774, STAT 786.		
STAT 899	Doctoral Dissertation	
Total		60

Ron Degges, Ph.D.

North Dakota State University, 2011
Field: Sampling, Regression Analysis

Seung Won Hyun, Ph.D.

University of Missouri, 2010
Field: Optimal Designs, Adaptive Designs, Clinical Trials

Rhonda Magel, Ph.D.

University of Missouri-Rolla, 1982
Field: Nonparametrics, Inference Under Order Restrictions, Regression

Megan Orr, Ph.D.

Iowa State University, 2012
Field: Biostatistics, Gene Expression Analysis, High-Dimensional Data, Analysis and Multiple Testing

Gang Shen, Ph.D.

Purdue University, 2009
Field: Mathematical Statistics, Asymptotic Theory, Bayesian Analysis, Change-Point Problem

Yarong Yang, Ph.D.

Northern Illinois University, 2010
Field: Machine Learning, Spatial Statistics, Bayesian Statistics, Bioinformatics