Statistics

Program and Application Information

Department Chair: Dr. Rhonda Magel
Department Location: Morrill Hall
Department Phone: (701) 231-7177
Department Email: ndsu.stats@ndsu.edu
Application Deadline: Application deadline is March 15 for international students and applicants who would like an opportunity for an assistantship if available.

Degrees Offered: Ph.D., M.S., Certificate
Test Requirement: GRE (recommended)
English Proficiency Requirements: TOEFL ibT 79 IELTS 6.5

Program Description

The Department of Statistics offers programs leading to a Ph.D. in statistics or a master'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, 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. A graduate certificate in Statistics for non majors is also offered.

Admissions Requirements

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://bulletin.ndsu.edu/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

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.

Graduate Certificate
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 if the student is not a 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.

M.S. Degree 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.

All students must:

Complete a set of core courses* with a grade of B or better, including

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<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>STAT 661</td>
<td>Applied Regression Models</td>
<td>3</td>
</tr>
<tr>
<td>STAT 662</td>
<td>Introduction to Experimental Design</td>
<td>3</td>
</tr>
<tr>
<td>STAT 764</td>
<td>Multivariate Methods</td>
<td>3</td>
</tr>
<tr>
<td>or STAT 774</td>
<td>Linear Models I</td>
<td></td>
</tr>
<tr>
<td>STAT 767</td>
<td>Probability and Mathematical Statistics I</td>
<td>3</td>
</tr>
<tr>
<td>STAT 768</td>
<td>Probability and Mathematical Statistics II</td>
<td>3</td>
</tr>
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Successfully complete two 1-credit practicums in consulting. Each statistical practicum will be listed as STAT 794

Complete an additional 9-12 hours (depends on number of research hours) of course work selected from the following courses:

<table>
<thead>
<tr>
<th>Course</th>
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</thead>
<tbody>
<tr>
<td>STAT 660</td>
<td>Applied Survey Sampling</td>
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<tr>
<td>STAT 663</td>
<td>Nonparametric Statistics</td>
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<tr>
<td>STAT 664</td>
<td>Discrete Data Analysis</td>
<td></td>
</tr>
<tr>
<td>STAT 669</td>
<td>Introduction to Biostatistics</td>
<td></td>
</tr>
<tr>
<td>STAT 670</td>
<td>Statistical SAS Programming</td>
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</tbody>
</table>
All students must:

1. Take a minimum of 42 semester credit hours, including at least 18 graduate course credits in computer science and at least 18 graduate course credits in statistics.
2. Take CSCI 713 Software Development Processes, CSCI 724 Survey of Artificial Intelligence, CSCI 732 Introduction To Bioinformatics Introduction to Bioinformatics, CSCI 765 Introduction To Database Systems and two additional graduate level courses in computer science.
3. Take STAT 661 Applied Regression Models, STAT 669 Introduction to Biostatistics, STAT 671 Introduction to the R Language, STAT 772 Computational Statistics, STAT 732 Introduction to Bioinformatics, and one additional graduate level course in statistics (does not include STAT 725 Applied Statistics or STAT 726 Applied Regression and Analysis of Variance).
4. Submit a plan of study at least one semester prior to graduation,
5. Pass a comprehensive exam, and
6. Successfully complete a research-based thesis or paper. The supervisory committee must consist of at least one faculty member from computer science and at least one faculty member from statistics.

**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 coursework 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 most 15 credits must be at the 700- to 800-level. Students must take STAT 786 Advanced Inference, STAT 764 Multivariate Methods and STAT 774 Linear Models I 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 and MATH 651 Real Analysis II.

- 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 Linear Models I. 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 dissertation.

**M.S. Degree in Computer Science and Statistics**

The program for the M.S. degree in computer science and statistics requires 42 semester credits with an overall GPA of 3.0 or higher. This program is designed with an emphasis in big data analysis. An oral defense of a research-based thesis or paper is required.

All students must:

1. Take a minimum of 42 semester credit hours, including at least 18 graduate course credits in computer science and at least 18 graduate course credits in statistics.
2. Take CSCI 713 Software Development Processes, CSCI 724 Survey of Artificial Intelligence, CSCI 732 Introduction To Bioinformatics Introduction to Bioinformatics, CSCI 765 Introduction To Database Systems and two additional graduate level courses in computer science.
3. Take STAT 661 Applied Regression Models, STAT 669 Introduction to Biostatistics, STAT 671 Introduction to the R Language, STAT 772 Computational Statistics, STAT 732 Introduction to Bioinformatics, and one additional graduate level course in statistics (does not include STAT 725 Applied Statistics or STAT 726 Applied Regression and Analysis of Variance).
4. Submit a plan of study at least one semester prior to graduation,
5. Pass a comprehensive exam, and
6. Successfully complete a research-based thesis or paper. The supervisory committee must consist of at least one faculty member from computer science and at least one faculty member from statistics.

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

This program requires an additional 30 hours in course work and 30 hours in research beyond M.S. degree. Students entering this program should have an M.S. degree in statistics or closely related field. Any core course required for the M.S. degree must be taken before obtaining the Ph.D. in Statistics (with Emphasis in Sports Statistics). This may require additional coursework beyond the 30 credits depending on the area in which the degree was obtained. Students in this program must:

*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 Linear Models I. 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.

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 Master's Thesis
or STAT 797 Master's Paper
Must have 15 hours of 700-800 level courses. 
Complete the following courses  

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</tr>
<tr>
<td>STAT 671</td>
<td>Introduction to the R Language</td>
</tr>
<tr>
<td>STAT 775</td>
<td>Using Statistics in Sports</td>
</tr>
</tbody>
</table>

Complete 15 credits of electives in graduate statistics courses. At least 12 of these credits must be 700- to 800-level. STAT 725 and STAT 726 will not be counted for this degree program.

Successfully complete three 1-credit practicums/internships in sports. Each statistical practicum will be listed as – STAT 794 Practicum/Internship.

• 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 in sports statistics.

*A student that enters this program with an M.S. degree in statistics or closely related field. Previously taken courses will be evaluated to determine their fit into this program.

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