

## STATISTICS

Today, most professional statistical training is received at the undergraduate, as well as at the graduate level. A major in statistics and a minor in any of the other related areas, such as mathematics, computer science, agriculture, biological sciences or social sciences provide a good blend of training suitable for many jobs in the industry, government and academic institutions. It is becoming increasingly important for those in other disciplines to have a good familiarity with basic statistical techniques and inference procedures.

### The Program

The Department of Statistics offers a major leading to bachelor's, master's and doctoral degrees. Two undergraduate minors are offered, one in applied statistics and the second in statistics. A graduate certificate in statistics is also available. A mathematics and statistics double major, the pre-actuarial science option and a degree in behavioral statistics are offered at the undergraduate level.

The department provides opportunities to study both applied and theoretical aspects of statistics. Computers are extensively used in statistics instruction, and statistical software packages and programs are utilized in various courses. Data analysis is an important aspect in applied statistics courses.

### Career Opportunities

There are excellent opportunities in statistics. Major corporations and most government agencies continually look for talented individuals with this type of education. Since even greater job opportunities are open to those with advanced statistical training, many undergraduates proceed directly to graduate work in statistics. Many students combine statistics with areas such as business, education, economics or biology.

Career opportunities are varied. A statistician may:

- consult in the design and analysis of clinical studies, evaluating new pharmaceutical agents;
- design experiments for agricultural, ecological, environmental or energy-related studies;
- determine mortality, morbidity and accident rates for an insurance company;
- serve as an opinion pollster for a public relations firm or a television network;
- develop theories of learning and behavior in conjunction with psychologists;
- determine optimal combinations and evaluate the performance of various chemicals in industrial setups;
- conduct reliability and quality control studies in various industries; or
- develop econometrics, time series and forecasting models for determining the cause and effects of various socio-economic variables on society.

Statisticians work closely with other scientists and researchers to develop new statistical techniques, adapt existing techniques, design experiments and direct analyses of surveys and retrospective studies.

Statisticians are ranked number one in best STEM jobs in 2017 according to U.S. News and World Report.

### The Facilities

The campus has several computer clusters connected to the campus network and the Internet. R, SAS, Python, SPSS and Minitab are among the statistical packages available. Computer consultants are available to assist students if programming help is needed.

### Statistics Curriculum

For a statistics major, 12 to 15 credits in mathematics, three to seven credits in computer science and 22 to 25 credits in statistics are required. A minor in one of the following areas is also required: social science, physical science, biological sciences, business, mathematics or computer science.

Students interested in biostatistics may minor in biological sciences, approved by the chair of the Department of Biological Sciences.

A student interested in business statistics may minor in business administration.

### Pre-Actuarial Option

A joint degree with mathematics with a pre-actuarial science option is also available.

### Behavioral Statistics Requirements

The behavioral statistics degree is a joint effort between the Department of Statistics and the Department of Psychology. Students wishing to obtain a degree in behavioral statistics should consult with an advisor in both departments. Employment opportunities include working with medical or Medicare data. Graduates of this program are expected to have good quantitative reasoning skills and strong people skills.

### The Faculty

- Rhonda C. Magel, Ph.D., Professor, Chair  
University of Missouri, 1982  
Field: Nonparametrics, Inference Under Order Restrictions, Regression
- Megan Orr, Ph.D., Associate Professor  
Iowa State University, 2012  
Field: Gene Expression Analysis, High-Dimensional Data Analysis, Multiple Testing
- Gang Shen, Ph.D., Associate Professor  
Purdue University, 2009  
Field: Mathematical Statistics, Asymptotic Theory, Bayesian Analysis, Change-Point Problem
- Ronald Degges, Ph.D., Associate Professor of Practice  
North Dakota State University, 2011  
Field: Survival Analysis, Nonparametrics and Regression
- Bong-Jin Choi, Ph.D., Assistant Professor  
University of South Florida, 2014  
Field: Big Health Care Data Analysis, Computational Statistics, Machine Learning, Biostatistics, Public Health Research
- Mingao Yuan, Ph.D., Assistant Professor  
Purdue University, 2018  
Field: Network Analysis, Big Data Analysis, Statistical Machine Learning

## Statistics Plan of Study

Please note this is a sample plan of study and not an official curriculum. Actual student schedules for each semester will vary depending on start year, education goals, applicable transfer credit, and course availability. Students are encouraged to work with their academic advisor on a regular basis to review degree progress and customize an individual plan of study.

<b>Freshman</b>			
<b>Fall</b>	<b>Credits</b>	<b>Spring</b>	<b>Credits</b>
ENGL 110 College Composition I	4	ENGL 120 College Composition II	3
COMM 110 Fundamentals of Public Speaking	3	MATH 129 Basic Linear Algebra	3
MATH 165 Calculus I	4	MATH 166 Calculus II	4
STAT 330 Introductory Statistics	3	CSCI 114 Microcomputer Packages	3
Gen Ed Wellness	2	Gen Ed Social & Behavioral Sciences/Gen Ed Global Perspectives/ Gen Ed Cultural Diversity	3
	<b>16</b>		<b>16</b>
<b>Sophomore</b>			
<b>Fall</b>	<b>Credits</b>	<b>Spring</b>	<b>Credits</b>
STAT 367 Probability	3	STAT 368 Statistics	3
STAT 461 Applied Regression Models	3	CSCI 160 Computer Science I	4
MATH 265 Calculus III	4	Minor Requirement	3
Gen Ed Humanities & Fine Arts/Gen Ed Global Perspectives/ Gen Ed Cultural Diversity	3	Gen Ed Humanities & Fine Arts	3
Gen Ed Science & Technology w/Lab	4	Gen Ed Science & Technology	3
	<b>17</b>		<b>16</b>
<b>Junior</b>			
<b>Fall</b>	<b>Credits</b>	<b>Spring</b>	<b>Credits</b>
Statistics Elective	6	STAT Elective	3
Minor Requirement	3	Minor Requirement	3
Gen Ed Social & Behavioral Sciences	3	Gen Ed Upper Division Writing	3
CSCI 222 Discrete Mathematics or MATH 270 Introduction to Abstract Mathematics	3	Gen Ed Humanities & Fine Arts/Gen Ed Social & Behavioral Sciences	3
	<b>15</b>		<b>12</b>
<b>Senior</b>			
<b>Fall</b>	<b>Credits</b>	<b>Spring</b>	<b>Credits</b>
STAT Elective	3	STAT 462 Introduction to Experimental Design	3
Minor Requirement	3	STAT Elective	3
Gen Ed Humanities & Fine Arts/Gen Ed Social & Behavioral Sciences	3	Minor Requirement	4
Electives	6	Electives	3-6
	<b>15</b>		<b>13-16</b>
<b>Total Credits: 120-123</b>			

View NDSU equivalencies of transfer courses at: [www.ndsu.edu/transfer/equivalencies](http://www.ndsu.edu/transfer/equivalencies)

### For Further Information

**MAILING ADDRESS:** Statistics | NDSU Dept 2770 | PO Box 6050 | Fargo, ND 58108-6050  
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**DEPT LOCATION:** Morrill Hall 221  
**DEPT PHONE:** (701) 231-7532  
**DEPT WEBSITE:** [www.ndsu.edu/statistics/](http://www.ndsu.edu/statistics/)