STATISTICS, BS

Banner Code: VS-BS-STIC

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Students may be admitted into this program beginning Spring 2018.

The Bachelor of Science in Statistics is designed to provide a framework for students to develop connections between statistical concepts and theories and their applications to statistical practice. It will prepare statisticians who can use modern statistical techniques to design studies, collect data, analyze and visualize high dimensional data sets, and draw valid conclusions in an increasingly data-centric world. In this program, students will meld the time-tested concepts and theories of statistics with modern methods of analysis, in order to interpret the data that is collected in nearly every discipline and every sector of industry and government.

The BS in Statistics requires a total of 120 credit hours, including major core requirements, concentration requirements, and Mason Core requirements. The program's major core curriculum provides students with a firm foundation in statistics, mathematics, and computing. Selection of a concentration allows a student to specialize in applied, theoretical, or computational aspects of statistical practice.   Students will select one of three concentrations: Applied Statistics, Mathematical Statistics, or Statistical Analytics. The Applied Statistics concentration focuses on developing proficiency in analytical methods applicable to a specific discipline of the student's choosing. This is accomplished through the requirement to complete a minor in a field that makes substantial use of data analysis. The Mathematical Statistics concentration is designed for students interested in mastering the theoretical underpinnings of statistics and probability; this concentration is recommended for students who intend to continue graduate studies in statistics or whose main focus is on research. The Statistical Analytics concentration blends the disciplines of computer science and statistics in a very modern way and is designed for students interested in applying concepts from statistics and computer science to the analysis of massive data sets.

Graduates of this program can look forward to careers in local, state, and federal government, and in the many industries that conduct scientific research, collect, and analyze data. They will enter the workforce with the ability to impact science, public policy, technology, and industry in a positive way through their expertise in data collection, analysis, synthesis, and interpretation, each with the highest ethical standards. Graduates will also be well prepared to continue their studies in graduate schools if they so desire.

Admissions & Policies

Advanced Placement, Credit by Exam
A score of 5 on the Advanced Placement (AP) statistics exam qualifies students for credit in STAT 260.

Change of Major
Students considering changing their major to Statistics should consult with the Volgenau School of Engineering Coordinator of Undergraduate Advising, 2500 Nguyen Engineering Building. These students must have a cumulative GPA of at least 2.75 and completed MATH 114 with a grade of C or better. See Change of Major for more information.

Grades
Students must earn a C or better in Major Core Requirement courses as well as in courses required to satisfy prerequisites.

Termination from major
No math, science, or Volgenau School of Engineering course that is required for the major may be attempted more than three times. Those students who do not successfully complete such a course within three attempts will be terminated from the major. Undeclared students in the Volgenau School who do not successfully complete a course required for a Volgenau School major within three attempts will also be terminated. For more information, see AP.5.2.4 Termination from the Major.

Once a student has attempted one of these courses twice unsuccessfully, the third attempt must be no later than the next semester of enrollment, excluding summers. Failure to take the course at that time will result in termination from the major. If the student is unable to take the course when required, the student may request an extension to a future semester; extensions require approval of the student's advisor, their department, and the Associate Dean for Undergraduate Programs. The deadline for extension requests is the add deadline for the semester in which the course is required.

Students who have been terminated from a Volgenau School of Engineering major may not register for a Volgenau School course without permission of the department offering the course. This applies to all undergraduate courses offered by the Volgenau School except IT 104 Introduction to Computing (Mason Core) and STAT 250 Introductory Statistics I (Mason Core).

A student may not declare any major in the Volgenau School of Engineering if the student has previously met the termination criteria for that major at any time, regardless of what the student's major was at the time the courses were taken.

Requirements

Degree Requirements
Total credits: 120

Major Core
Statistics Core

STAT 260	Introduction to Statistical Practice	3
STAT 334	Introduction to Probability Models and Simulation	3
or STAT 346	Probability for Engineers	
STAT 354	Probability and Statistics for Engineers and Scientists II	3
STAT 362	Introduction to Computer Statistical Packages	3
STAT 456	Applied Regression Analysis	3
STAT 463	Introduction to Exploratory Data Analysis	3
STAT 489	Pre-Capstone Professional Development	3

STAT 490	Capstone in Statistics (Mason Core)	3
Total Credits		24

Mathematics Core

MATH 113	Analytic Geometry and Calculus I (Mason Core) [1,2]	4
MATH 114	Analytic Geometry and Calculus II [3]	4
MATH 203	Linear Algebra	3
Total Credits		11

[1] Math 123-124 may be taken in place of MATH 113 if student does not have sufficiently high math placement scores to be eligible for MATH 113.

[2] MATH 115 may be taken in place of MATH 113 if student qualifies.

[3] MATH 116 may be taken in place of MATH 114 if student qualifies.

Computational Skills Core

CS 105	Computer Ethics and Society (Mason Core) [1]	1
or CDS 151	Data Ethics in an Information Society (Mason Core)	
CS 112	Introduction to Computer Programming (Mason Core)	4
Total Credits		5

[1] Students in the Statistical Analytics concentration must take CS 105.

Restricted Electives

Statistics

Select nine credits of STAT electives	9
STAT courses numbered 440-499 [1]	
Total Credits	9

[1] May not be used to fulfill other degree requirements.

Technical

Select nine credits of technical electives. Specific course selections must be pre-approved by the undergraduate coordinator. Students may need to choose electives to satisfy prerequisites for some of these courses. In some cases, students will need to contact other departments for permission to enroll.		9
CDS courses numbered above 200		
CS courses numbered above 200		
MATH courses numbered above 200		
OR courses numbered above 300		
BENG 322	Health Data Challenges	
CYSE 325	Discrete Events Systems Modeling	
ENGH 388	Professional and Technical Writing	
IT 214	Database Fundamentals	
SYST 473	Decision and Risk Analysis	
SYST 488	Financial Systems Engineering	
Total Credits		9

Concentrations

Select one concentration and complete all requirements.

Concentration in Applied Statistics (ASTA)

Focuses on developing proficiency in analytical methods applicable to a specific discipline of the student's choosing. This is accomplished through the requirement to complete a minor in a field that makes substantial use of data analysis.

Students must complete 15 - 21 credits in a pre-approved minor, selected in consultation with the undergraduate coordinator. Courses taken to fulfill the minor requirements that are not used to fulfill Major Core or Restricted Electives requirements are considered unique to the minor. At least 15 credits of the minor coursework, technical electives, general electives, and additional Mason Core courese must be at or above the 300 level.	15-21

Concentration in Mathematical Statistics (MTHS)

Designed for students interested in mastering the theoretical underpinnings of statistics and probability; this concentration is recommended for students who intend to continue graduate studies in statistics or whose main focus is on research.

STAT 356	Statistical Theory	3
CDS 130	Computing for Scientists (Mason Core)	3
MATH 213	Analytic Geometry and Calculus III [1]	3
MATH 290	Introduction to Advanced Mathematics	3
MATH 315	Advanced Calculus I	3
Total Credits		15

[1] MATH 215 may be taken in place of MATH 213 if student qualifies.

At least 9 credits of the technical electives, general electives, and additional Mason Core courses must be at or above the 300 level.

Concentration in Statistical Analytics (STLA)

Blends the disciplines of computer science and statistics in a very modern way and is designed for students interested in applying concepts from statistics and computer science to the analysis of massive data sets.

STAT 472	Introduction to Statistical Learning	3
CS 211	Object-Oriented Programming	3
CS 310	Data Structures	3
CS 330	Formal Methods and Models	3
CS 450	Database Concepts	3
or CDS 302	Scientific Data and Databases	
CS 484	Data Mining	3
or CDS 303	Scientific Data Mining	
MATH 125	Discrete Mathematics I (Mason Core)	3
OR 481	Numerical Methods in Engineering	3
Total Credits		24

Additional Mason Core

Foundation Requirements

Written Communication [1]	6
Oral Communication	3
Core Requirements	
Literature	3

Arts	3
Western Civilization/World History	3
Global Understanding	3
Social and Behavioral Sciences	3
Natural Science	7
Total Credits	31

[1]   Statistics majors must take the Natural Sciences and Technology section of ENGH 302.

General Electives

The number of general elective credits varies with choice of concentration	7-16
Total Credits	7-16