

STATISTICS, BS

Degree: Bachelor of Science (BS)

Major: Statistics

Program Overview

All undergraduate degrees in the department are based on a four-course sequence in calculus and differential equations and have a computational component. The statistics degrees all require a further statistics core and a minimum of 120 credit hours.

Students in statistics begin with a foundation in mathematics. Then they add statistical theory, plus intensive modern data analysis and a concentration in a field of their choice. The goal is to develop an appreciation of each facet of the discipline and a mastery of technical skills. This prepares students to enter a growing profession with opportunities in the academic, governmental, actuarial, and industrial spheres.

The Bachelor of Science degree in Statistics differs from the Bachelor of Arts by requiring more credit hours in the major (although the same total credit hours for the degree), some of which provide a broad background in the sciences.

Learning Outcomes

- Students will be able to know the fundamental concepts of probability theory, random variables, probability distributions, moments, and the transformation of random variables.
- Students will be able to correctly identify appropriate probability models for a given random phenomenon and demonstrates the capability of finding distributions of functions of random variables and properties thereof.
- Students will be able to know the fundamental concepts of the central limit theorem, law of large numbers, theory of estimation, and hypothesis testing.
- Students will be able to demonstrate the capability of setting up the mathematical proof for finding large sample properties of estimators and/or is able to construct appropriate statistical inferential procedures using such estimators.
- Students will be able to know the fundamental concepts of linear regression models and is trained with appropriate statistical software for exploratory data analysis, data visualization, building regression models, carrying out statistical inferences, and validations of model assumptions.
- Students will be able to formulate an appropriate linear regression model for a given problem, is able to fit such a model and use it for statistical inference, and/or identify its limitations.
- Students will be able to express a given research problem in quantitative and statistical terms, finds the appropriate set of statistical methods and/or models to solve the problem, and is able to implement them using appropriate statistical software that leads to the solution of the problem.
- Students will be able to effectively communicate the statistical analysis to a non-expert in statistics and is able to put the work in the proper context in the form of a technical report.

Undergraduate Policies

For undergraduate policies and procedures, please review the Undergraduate Academics section of the General Bulletin.

Accelerated Master's Programs

Undergraduate students may participate in accelerated programs toward graduate or professional degrees. For more information and details of the policies and procedures related to accelerated studies, please visit the Undergraduate Academics section of the General Bulletin.

Program Requirements

Students seeking to complete this major and degree program must meet the general requirements for bachelor's degrees and the Unified General Education Requirements. Students completing this program as a secondary major while completing another undergraduate degree program do not need to satisfy the school-specific requirements associated with this major.

The BS degree in statistics requires a minimum of 62 hours of approved coursework, including 27 hours in statistics and the remainder in related disciplines and a substantive field of application. In addition to the requirements for the BA, the BS degree includes a laboratory science requirement. For students seriously interested in basic science, a natural science is the logical choice as a focus for the application, and the BS degree is the logical choice of program. The specific requirements are as follows:

Code	Title	Credit Hours
MATH 121	Calculus for Science and Engineering I	4
MATH 122 or MATH 124	Calculus for Science and Engineering II Calculus II	4
MATH 223 or MATH 227	Calculus for Science and Engineering III Calculus III	3
MATH 224 or MATH 228	Elementary Differential Equations Differential Equations	3
MATH 201	Introduction to Linear Algebra for Applications	3
Two computation classes:		6
ENGR 131	Elementary Computer Programming	
An additional advanced-level course in computation. Consult your advisor for courses.		
STAT 325	Data Analysis and Linear Models	3
STAT 326	Multivariate Analysis and Data Mining	3
STAT 345	Theoretical Statistics I	3
STAT 346	Theoretical Statistics II	3
At least 15 hours of courses in statistical methodology, to be chosen from STAT courses numbered 300 and higher, or approved courses in statistical methodology or probability taught in biostatistics, electrical engineering and computer science, economics, mathematics, operations research, systems engineering, etc. At least 9 hours must be in STAT. STAT 243 and STAT 244 may be counted.		15
A combined total of 12 hours (or more) in ASTR, BIOL, CHEM, or PHYS which may be counted toward a major in that field, including at least one of the following sequences:		12
PHYS 121 & PHYS 122	General Physics I - Mechanics and General Physics II - Electricity and Magnetism	

CHEM 105 Principles of Chemistry I
& CHEM 106 and Principles of Chemistry II
& CHEM 113 and Principles of Chemistry Laboratory

Students are strongly encouraged to include advanced expository or technical writing courses in their programs.

Total Credit Hours

62

Concentration Requirements

Actuarial Science Concentration

A student interested in Actuarial Science should take STAT 317 and STAT 318 STAT 318 Actuarial Science II among the 18 hours in statistical methodology, and should discuss with their advisor courses in operations research and numerical analysis which are fundamental to actuarial theory and computation.