BACHELOR OF SCIENCE (BS) DEGREE WITH A MAJOR IN STATISTICS

Program Learning Outcomes for the BS Degree with a Major in Statistics

Upon completing the BS degree with a major in Statistics, students will be able to:

1. Apply advanced knowledge and theory in probability and statistical inference.
2. Apply and evaluate statistical models.
3. Apply statistical computing for data analysis and data science.
4. Demonstrate competency as a professional statistician.
5. Effectively communicate as a professional statistician.

Requirements for the BS Degree with a Major in Statistics

For general university requirements, see Graduation Requirements (https://ga.rice.edu/undergraduate-students/academic-policies-procedures/graduation-requirements/). Students pursuing the BS degree with a major in Statistics must complete:

- A minimum of 19 courses (58-65 credit hours, depending on course selection) to satisfy major requirements.
- A minimum of 120 credit hours to satisfy degree requirements.
- A minimum of 14 courses (43 credit hours) taken at the 300-level or above.
- A maximum of 3 courses (9 credit hours) in departmental (STAT) coursework from study abroad or transfer credit. For additional departmental guidelines regarding transfer credit, see the Policies (p. 3) tab.

The courses listed below satisfy the requirements for this major. In certain instances, courses not on this official list may be substituted upon approval of the major's academic advisor or, where applicable, the department's Director of Undergraduate Studies. (Course substitutions must be formally applied and entered into Degree Works by the major's Official Certifier (https://registrar.rice.edu/facstaff/degreeworks/officialcertifier/).) Students and their academic advisors should identify and clearly document the courses to be taken.

Summary

Code	Title	Credit Hours
Total Credit Hours Required for the Major in Statistics		58-65
Total Credit Hours Required for the BS Degree with a Major in Statistics		120

Degree Requirements

Code	Title	Credit Hours
Core Requirements		
Mathematics		
MATH 101	SINGLE VARIABLE CALCULUS I	3
or MATH 105	AP/OTH CREDIT IN CALCULUS I	
MATH 102	SINGLE VARIABLE CALCULUS II	3
or MATH 106	AP/OTH CREDIT IN CALCULUS II	
Select 1 from the following:		*3 or 6*
MATH 212	MULTIVARIABLE CALCULUS	
MATH 221 & MATH 222	HONORS CALCULUS III and HONORS CALCULUS IV	
MATH 232	HONORS MULTIVARIABLE CALCULUS	
Select 1 course from the following:		*3*
CMOR 302	MATRIX ANALYSIS	
CMOR 303	MATRIX ANALYSIS FOR DATA SCIENCE	
MATH 355	LINEAR ALGEBRA	
MATH 354	HONORS LINEAR ALGEBRA	
Select 1 course from the following:		*3*
MATH 302	ELEMENTS OF ANALYSIS	
MATH 321	INTRODUCTION TO ANALYSIS I	
MATH 331	HONORS ANALYSIS	
MATH 427	COMPLEX ANALYSIS	
Statistical Computation		
STAT 405	R FOR DATA SCIENCE	3
Basic Computing		
Select 1 course from the following:		*3-4*
CMOR 220	INTRODUCTION TO ENGINEERING COMPUTATION	
COMP 140	COMPUTATIONAL THINKING	
COMP 182	ALGORITHMIC THINKING	
Advanced Computing		
Select 1 course from the following:		*3-4*
CMOR 360	INTRODUCTION TO OPERATIONS RESEARCH AND OPTIMIZATION [2]	
CMOR 422	NUMERICAL ANALYSIS	
CMOR 441	LINEAR AND INTEGER PROGRAMMING	
CMOR 520	COMPUTATIONAL SCIENCE	
COMP 215	INTRODUCTION TO PROGRAM DESIGN	
COMP 322 / ELEC 323	PRINCIPLES OF PARALLEL PROGRAMMING [2]	
COMP 330	TOOLS AND MODELS FOR DATA SCIENCE [2]	
COMP 382	REASONING ABOUT ALGORITHMS [2]	
DSCI 302	INTRODUCTION TO DATA SCIENCE TOOLS AND MODELS	
Probability and Statistics		
Select 1 course from the following:		*3-4*
STAT 310 / ECON 307	PROBABILITY AND STATISTICS	
STAT 311	HONORS PROBABILITY AND MATHEMATICAL STATISTICS	
STAT 315 / DSCI 301	PROBABILITY AND STATISTICS FOR DATA SCIENCE	
STAT 410	LINEAR REGRESSION	4
STAT 418	PROBABILITY	3
STAT 419	STATISTICAL INFERENCE	3
Elective Requirements [1]		

Select 6 elective courses from departmental (STAT) course offerings at the 300-level or above, including at least 4 courses from the following Methodology/Theory courses:		*18*
STAT 411	ADVANCED STATISTICAL METHODS	
STAT 413	INTRODUCTION TO STATISTICAL MACHINE LEARNING	
STAT 421	APPLIED TIME SERIES AND FORECASTING	
STAT 425	INTRODUCTION TO BAYESIAN INFERENCE	
STAT 453	BIOSTATISTICS	
STAT 502 / COMP 502 / ELEC 502	NEURAL MACHINE LEARNING I	
STAT 525	BAYESIAN STATISTICS	
STAT 532	FOUNDATIONS OF STATISTICAL INFERENCE I	
STAT 533	FOUNDATIONS OF STATISTICAL INFERENCE II	
STAT 541	MULTIVARIATE ANALYSIS	
STAT 545	GLM & CATEGORICAL DATA ANALYSIS	
STAT 550	NONPARAMETRIC FUNCTION ESTIMATION	
STAT 552	APPLIED STOCHASTIC PROCESSES	
STAT 581 / CMOR 552	MATHEMATICAL PROBABILITY I	
STAT 582	MATHEMATICAL PROBABILITY II	
STAT 650	STOCHASTIC CONTROL AND STOCHASTIC DIFFERENTIAL EQUATIONS	
Senior Capstone [3]		
Select 1 course from the following:		*3-4*
DSCI 435 / COMP 449	APPLIED MACHINE LEARNING AND DATA SCIENCE PROJECTS [4]	
STAT 450	SENIOR CAPSTONE PROJECT	
Total Credit Hours Required for the Major in Statistics		58-65
Additional Credit Hours to Complete Degree Requirements *		24-31
University Graduation Requirements (https://ga.rice.edu/undergraduate-students/academic-policies-procedures/graduation-requirements/) *		31
Total Credit Hours		**120**

Footnotes and Additional Information

* **Note**: University Graduation Requirements include 31 credit hours, comprised of Distribution Requirements (Groups I, II, and III), FWIS, and LPAP coursework. In some instances, courses satisfying FWIS or distribution requirements may additionally meet other requirements, such as the Analyzing Diversity (AD) requirement, or some of the student's declared major, minor, or certificate requirements. Additional Credit Hours to Complete Degree Requirements include general electives, coursework completed as upper-level, residency (hours taken at Rice), and/or any other additional academic program requirements.

1 With advisor approval, 1 course (3 credit hours) from departments other than Statistics (STAT) may be used as an elective. The substitution course may not be used as a replacement for 1 of the 4 required Methodology/Theory courses listed above. STAT 305, STAT 310, STAT 311, STAT 315, and STAT 385 will not count as an Elective Requirement. See below for typically approved coursework.

2 CMOR 360 (formerly CAAM 378), COMP 322 / ELEC 323, COMP 330, and COMP 382 are also listed in the Approved Elective category outside departmental (STAT) course offerings. If completed to fulfill Advanced Computing, the course may not be used as an Approved Elective.

3 The Senior Capstone requirement may not be fulfilled by transfer credit.

4 DSCI 435 / COMP 449 is also listed in the Approved Elective category outside departmental (STAT) course offerings. If complete to fulfill the Senior Capstone requirement, this course may not be used as an Approved Elective.

Approved Electives

With advisor approval, up to 1 course (3-4 credit hours) from outside departmental (STAT) course offerings may be chosen to fulfill Elective Requirements. The following courses are a sample of approved electives outside Statistics (STAT), however, other courses may be approved by an advisor.

Code	Title	Credit Hours
Approved Electives outside Statistics (STAT)		
CMOR 350	STOCHASTIC MODELS	
CMOR 360	INTRODUCTION TO OPERATIONS RESEARCH AND OPTIMIZATION [1]	
CMOR 451	SIMULATION MODELING AND ANALYSIS	
CMOR 455	STOCHASTIC CONTROL AND APPLICATIONS	
COMP 322 / ELEC 323	PRINCIPLES OF PARALLEL PROGRAMMING [1]	
COMP 330	TOOLS AND MODELS FOR DATA SCIENCE [1]	
COMP 382	REASONING ABOUT ALGORITHMS [1]	
COMP 422	PARALLEL COMPUTING	
COMP 430	INTRODUCTION TO DATABASE SYSTEMS	
COMP 440 / ELEC 440	ARTIFICIAL INTELLIGENCE	
COMP 441	LARGE-SCALE MACHINE LEARNING	
COMP 502 / ELEC 502 / STAT 502	NEURAL MACHINE LEARNING I	
DSCI 304	INTRODUCTION TO EFFECTIVE DATA VISUALIZATION	
DSCI 435 / COMP 449	APPLIED MACHINE LEARNING AND DATA SCIENCE PROJECTS [2]	
ECON 300	GAME THEORY AND OTHER MICRO TOPICS FOR ECON MAJORS	
ECON 305	GAME THEORY AND OTHER MICRO TOPICS FOR MTEC MAJORS	
ECON 308	MATHEMATICAL ECONOMICS	

ECON 310 / STAT 376	ECONOMETRICS
ECON 418	ECONOMIC FORECASTING
ECON 419	DATA TOOLS FOR COMPUTATIONAL ECONOMICS
ECON 449	PRINCIPLES OF FINANCIAL ENGINEERING

Footnotes and Additional Information

1 CMOR 360 (formerly CAAM 378), COMP 322 / ELEC 323, COMP 330, and COMP 382 are also listed in the Advanced Computing category. If completed to fulfill Advanced Computing, the course may not be used as an Approved Elective.

2 DSCI 435 / COMP 449 is also listed as a Senior Capstone. If completed to fulfill the Senior Capstone requirement, this course may not be used as an Approved Elective.

Policies for the BS Degree with a Major in Statistics

Program Restrictions and Exclusions

Students pursuing the BS Degree with a Major in Statistics should be aware of the following program restrictions:

- As noted in Majors, Minors, and Certificates (https://ga.rice.edu/undergraduate-students/academic-opportunities/majors-minors-certificates/) under *Declaring Majors, Minors and Certificates*, students may not obtain both a BA and a BS in the same major. Students pursuing the BS Degree with a Major in Statistics may not additionally pursue the BA Degree with a Major in Statistics.

- As noted in Majors, Minors, and Certificates (https://ga.rice.edu/undergraduate-students/academic-opportunities/majors-minors-certificates/), students may not major and minor in the same subject.

- Students pursuing the BS Degree with a Major in Statistics that are additionally pursuing the minor in Data Science may fulfill its requirements according to the following guidelines: i.) DSCI 301 is fulfilled by STAT 310, STAT 311, or STAT 315; ii.) DSCI 302 may be used as the STAT major's Advanced Computing elective; and iii.) DSCI 303 ***must*** be substituted with STAT 413.

Transfer Credit

For Rice University's policy regarding transfer credit, see Transfer Credit (https://ga.rice.edu/undergraduate-students/academic-policies-procedures/transfer-credit/). Some departments and programs have additional restrictions on transfer credit. Requests for transfer credit must be approved for Rice equivalency by the designated transfer credit advisor for the appropriate academic department offering the Rice equivalent course (corresponding to the subject code of the course content). The Office of Academic Advising maintains the university's official list of transfer credit advisors (https://oaa.rice.edu/advising-network/transfer-credit-advisors/) on their website: https://oaa.rice.edu. Students are encouraged to meet with the applicable transfer credit advisor as well as their academic program director when considering transfer credit possibilities.

Departmental Transfer Credit Guidelines

Students pursuing the major in Statistics should be aware of the following departmental transfer credit guidelines:

- No more than 3 courses (9 credit hours) in departmental (STAT) coursework of transfer credit from U.S. or international universities of similar standing as Rice may apply towards the major.
- The Senior Capstone requirement may not be fulfilled by transfer credit.

Additional Information

For additional information, please see the Statistics website: https://statistics.rice.edu/.

Opportunities for the BS Degree with a Major in Statistics

Academic Honors

The university recognizes academic excellence achieved over an undergraduate's academic history at Rice. For information on university honors, please see Latin Honors (https://ga.rice.edu/undergraduate-students/honors-distinctions/university/) (*summa cum laude*, *magna cum laude*, and *cum laude*) and Distinction in Research and Creative Work (https://ga.rice.edu/undergraduate-students/honors-distinctions/university/). Some departments have department-specific Honors awards or designations.

Fifth-Year Master's Degree Option for Rice Undergraduate Students

In certain situations and with some terminal master's degree programs, Rice students have an option to pursue a master's degree by adding an additional fifth year to their four years of undergraduate studies.

Advanced Rice undergraduate students in good academic standing typically apply to the master's degree program during their junior or senior year. Upon acceptance, depending on course load, financial aid status, and other variables, they may then start taking some required courses of the master's degree program. A plan of study will need to be approved by the student's undergraduate major advisor and the master's degree program director.

As part of this option and opportunity, Rice undergraduate students:

- must complete the requirements for a bachelor's degree and the master's degree independently of each other (i.e. no course may be counted toward the fulfillment of both degrees).
- should be aware there could be financial aid implications if the conversion of undergraduate coursework to that of graduate level reduces their earned undergraduate credit for any semester below that of full-time status (12 credit hours).
- more information on this *Undergraduate - Graduate Concurrent Enrollment* opportunity, including specific information on the registration process can be found here (https://ga.rice.edu/undergraduate-students/academic-opportunities/undergraduate-graduate-concurrent-enrollment/).

Rice undergraduate students completing studies in science and engineering may have the option to pursue the Master of Statistics (MStat) degree. For additional information, students should contact their undergraduate major advisor and the MStat program director.

Internship and Research Opportunities

The Department of Statistics encourages its major and minors to participate the practice of statistics through summer internships, employment and research. Information on current opportunities are

posted on the *Undergraduate Programs* tab of the department website (https://statistics.rice.edu/academics/undergraduate/). Students can also approach individual faculty about research opportunities in their group. An undergraduate advisor can talk with you about these and other possibilities.

Additional Information

For additional information, please see the Statistics website: https://statistics.rice.edu/.