

# STATISTICS MAJORS WITH STATISTICAL METHODS AND THEORY OPTION

## Program Curriculum

Code	Title	Credits
<b>Degree Core Requirements</b>		
STAT 3006	Statistical Methods	3
STAT 3104	Probability and Distributions	3
STAT 4105	Theoretical Statistics	3
STAT 4106	Theoretical Statistics	3
STAT 4204	Experimental Designs	3
STAT 4214	Methods of Regression Analysis	3
STAT 4444	Applied Bayesian Statistics	3
Subtotal		21
<b>Major Requirements</b>		
STAT 3654	Introductory Data Analytics and Visualization	3
STAT 4004	Methods of Statistical Computing	3
STAT 4024	Communication in Statistical Collaborations	3
MATH 2204	Introduction to Multivariable Calculus	3
MATH 2114	Introduction to Linear Algebra	3
Select one of the following:		3
CS 1064	Introduction to Programming in Python	
CS 1114	Introduction to Software Design	
Subtotal		18
<b>Option Required Courses</b>		
STAT 4584	Advanced Calculus for Statistics	3
or MATH 3224	Advanced Calculus	
MATH 3034	Introduction to Proofs	3
Select one of the following: <sup>4</sup>		3
CS 1014	Introduction to Computational Thinking	
CS 1064	Introduction to Programming in Python <sup>1</sup>	
CS 1114	Introduction to Software Design	
CS 2064	Intermediate Programming in Python	
CS 2114	Software Design and Data Structures	
MATH 3054	Programming for Mathematical Problem Solving <sup>4</sup>	
STAT 3094	SAS Programming	
<b>Restricted Electives</b>		
Select four of the following (at least <b>two</b> must be STAT)		12
STAT 3204	Data Visualization	
STAT 3504	Nonparametric Statistics	
STAT 4364	Introduction to Statistical Genomics	
STAT 4504	Applied Multivariate Analysis	
STAT 4514	Introduction to Categorical Data Analysis	
STAT 4524	Sample Survey Methods	
STAT 4534	Applied Statistical Time Series Analysis	
STAT 4654	Intermediate Data Analytics and Machine Learning	
STAT 4664	Computational Intensive Stochastic Modleing	
STAT 4804	Elementary Econometrics <sup>1</sup>	
STAT 4964	Field Study <sup>2</sup>	

or STAT 4994	Undergraduate Research	
CS 4234	Parallel Computation <sup>3</sup>	
ECE 4424	Machine Learning <sup>3</sup>	
MATH 3134	Applied Combinatorics and Graph Theory <sup>3</sup>	
MATH 4144	Linear Algebra II <sup>3</sup>	
MATH 4454	Applied Mathematical Modeling <sup>3</sup>	
MATH 4225	Elementary Real Analysis <sup>3</sup>	
ISE 4404	Statistical Quality Control <sup>3</sup>	
Subtotal		21
<b>Free Electives</b>		
Select remaining credits required for the degree:		13
Subtotal		13
<b>Pathways to General Education</b>		
<i>Pathways Concept 1 - Discourse</i>		
ENGL 1105	First-Year Writing (1F)	3
ENGL 1106	First-Year Writing (1F)	3
ENGL 3764	Technical Writing (1F)	3
<i>Pathways Concept 2 - Critical Thinking in the Humanities</i>		
Select six credits in Pathway 2 ( <a href="https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G02">https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G02</a> )		6
<i>Pathways Concept 3 - Reasoning in the Social Sciences</i>		
Select six credits in Pathway 3 ( <a href="https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G03">https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G03</a> )		6
<i>Pathways Concept 4 - Reasoning in the Natural Sciences</i>		
Select six credits in Pathway 4 ( <a href="https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G04">https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G04</a> )		6
<i>Pathways Concept 5 - Quantitative and Computational Thinking</i>		
MATH 1225	Calculus of a Single Variable	8
& MATH 1226	and Calculus of a Single Variable (required of all students majoring in Statistics; 5F)	
STAT 3005	Statistical Methods (required of all students majoring in Statistics; 5F)	3
<i>Pathways Concept 6 - Critique and Practice in Design and the Arts</i>		
Select 6 credits = 3 in design + 3 in arts, or 6 in integrated design and arts)		6
<i>Pathways Concept 7 - Critical Analysis of Identity and Equity in the United States</i>		
Select three credits in Pathway 7 ( <a href="https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G07">https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G07</a> )		3
Subtotal		47
<b>Total Credits</b>		<b>120</b>

<sup>1</sup> For Economic majors or minors, ECON 4304 Introduction to Econometric Methods can substitute for STAT 4804 Elementary Econometrics.

<sup>2</sup> A maximum of 3 credits from either STAT 4964 Field Study (for internships or other summer experience), or STAT 4994 Undergraduate Research may count as a Statistic elective with prior approval from the department.

<sup>3</sup> An upper-level course that is not offered by the Department of Statistics. Be aware of *all* prerequisites.

<sup>4</sup> These courses must be different from the course completed in the major requirements section.

## Graduation Requirements

Virginia Tech requires **120** credit hours to graduate with a GPA of 2.0 or greater for all hours attempted. The 120 credit hours must include all required courses for the statistic major as outlined in this check-sheet. In addition, students must have an in-major GPA of 2.0 or greater. For purposes of GPA computation, courses in-major will include core requirements, major requirements, and restricted electives. If 120 credit hours are reached and a student does not meet the GPA requirement, the student must take additional in-major courses to raise the in-major GPA to a 2.0.

All students completing a B.S. in Statistics must complete MATH 1225 Calculus of a Single Variable-MATH 1226 Calculus of a Single Variable and STAT 3005 Statistical Methods. These courses are listed in Pathways to General Education above.

## Prerequisites

Some courses listed on this checksheet may have prerequisites; please consult the Undergraduate Course Catalog or check with your advisor for more information.

## Foreign Language Requirement

Students who did not successfully complete at least two years of a single foreign, classical, or sign language during high school must successfully complete six semester hours of a single foreign, classical, or sign language at the college level. Courses taken to meet this requirement do not count toward the hours required for graduation. Please consult the Undergraduate Catalog for details.

## Course Substitutions

CMDA 2005 Integrated Quantitative Sciences-CMDA 2006 Integrated Quantitative Sciences is equivalent to all the following: STAT 3005 Statistical Methods **and** STAT 3006 Statistical Methods **and** STAT 3104 Probability and Distributions **and** MATH 2214 Introduction to Differential Equations **and** (MATH 2204 Introduction to Multivariable Calculus **or** MATH 2204H Introduction to Multivariable Calculus **or** MATH 2406H Mathematics in a Computational Context

## Satisfactory Progress Towards Degree and Minimum Grade Requirements

- Within the first two attempts, including attempts ending in course withdrawal, students must earn a C- or better in all MATH, STAT, or CS designated courses for the degree (or equivalents thereof).
- It is recommended that, upon attempting 72 credit hours, students will have completed STAT 3005 Statistical Methods, MATH 1225 Calculus of a Single Variable, MATH 1226 Calculus of a Single Variable, MATH 2114 Introduction to Linear Algebra, MATH 2204 Introduction to Multivariable Calculus, and CS 1064 Introduction to Programming in Python or CS 1114 Introduction to Software Design.
- Upon having attempted 90 semester credits, students must have an in-major GPA of 2.00 or better.