

College of Science, Department of Statistics  
 Bachelor of Science, Major in Statistics, **Statistical Methods and Theory Option**  
**(SMTH)** For students entering under UG Catalog **2023-2024**

A dagger (†) indicates a course with prerequisites or co-requisites.

**I. Pathways General Education (47 credits)**

**Concept 1 Discourse (9 credits)**

**(1f):** 6 credits in foundational courses. ENGL 1105-1106 required

ENGL 1105 First- Year Writing	<b>3</b>	
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† ENGL 1106 First-Year Writing	<b>3</b>	
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**(1a):** 3 credits in advanced or applied writing or speaking courses. ENGL 3764 is required

† ENGL 3764 Technical Writing	<b>3</b>	
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**Concept 2 Critical Thinking in Humanities (6 credits)**

	<b>3</b>	
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	<b>3</b>	
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**Concept 3 Reasoning in the Social Sciences (6 credits)**

	<b>3</b>	
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	<b>3</b>	
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**Concept 4 Reasoning in the Natural Sciences (6 credits)**

	<b>3</b>	
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	<b>3</b>	
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**Concept 5 Quantitative and Computational Thinking (11 Credits)**

**(5f):** 6 credits in foundational courses. The following course sequence is required of all students majoring in Statistics.

† MATH 1225 Calculus of a Single Variable	<b>4</b>	
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† MATH 1226 Calculus of a Single Variable	<b>4</b>	
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**(5a):** 3 credits in advanced or applied courses. The following course is required of all students majoring in Statistics.

† STAT 3005 Statistical Methods	<b>3</b>	
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**Concept 6 Critique and Practice in Design and the Arts (6 credits = 3 in design + 3 in arts, or 6 in integrated design and arts)**

	<b>3</b>	
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	<b>3</b>	
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**Concept 7 Critical Analysis of Identity and Equity in the United States (3 credits)**

	<b>3</b>	
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**II. Statistics Bachelor of Science Degree Core Requirements (21 credits)**

**Statistics Required Courses. Complete all the following courses (21 credits)**

† 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	

\*All students completing a B.S. in Statistics must complete STAT 3005 Statistical Methods. This requirement is included in Section I above.

**III. Statistics Bachelor of Science Degree Major Requirements (18 credits)**

**Statistics Required Courses. Complete all the following courses (9 credits)**

† STAT/CMDA/CS 3654 Introductory Data Analytics and Visualization	3	
† STAT 4004 Methods Statistical Computing	3	
† STAT 4024 Communication in Statistical Collaboration	3	

**Mathematics Required Courses. Complete all the following courses (6 credits)**

† MATH 2204 Intro Multivariable Calculus	3	
† MATH 2114 Introduction to Linear Algebra	3	

\*\*All students completing a B.S. in Statistics must complete MATH 1225-1226. These courses are listed in Section I above.

**Computer Programming Required Courses. Complete ONE of the following courses (3 credits)**

CS 1064 <sup>1</sup> Introduction to Programming in Python	3	
CS 1114 Introduction to Software Design	3	

**IV. Required Courses Specific to the Statistical Methods and Theory Option (21 credits)**

**Statistics Required Courses. Complete all the following courses (3 credits)**

† STAT 4584 Advanced Calculus for Statistics OR †MATH 3224 Advanced Calculus	3	
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**Mathematics Required Courses. Complete all the following courses (3 credits)**

† MATH 3034 Introduction to Proofs	3	
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**Computer Programming Required Courses. Complete ONE of the following courses (3 credits)**

CS 1014 Introduction Computational Thinking	3	
CS 1064 <sup>1</sup> Introduction to Programming in Python	3	
CS 1114 Introduction to Software Design	3	
†CS 2064 Intermediate Programming in Python	3	
†CS 2114 Software Design and Data Structures	3	
MATH 3054 <sup>4</sup> Programming for Math	3	
† STAT 3094 SAS Programming	3	

\*\* These courses must be different from the course completed to meet the computer programming requirement in Section III.

**Complete FOUR courses from the following list. At least TWO of the four must be STAT (12 credits)**

† STAT 3204 Data Visualization	3	
† STAT 3504 Nonparametric Statistics	3	
† STAT 4364 Introduction to Statistical Genomics	3	
† STAT 4504 Applied Multivariate Analysis	3	
† STAT 4514 Introduction to Categorical Data Analysis	3	
† STAT 4524 Sample Survey Methods	3	
† STAT 4534 Applied Time Series	3	
† STAT/CMDA/CS 4654 Intermediate Data Analytics and Machine Learning	3	
† STAT/CMDA 4664 Computational Intensive Stochastic Modeling	3	
† STAT/AAEC 4804 <sup>2</sup> Elementary Econometrics	3	
STAT 4964 <sup>3</sup> Field Study or STAT 4994 <sup>3</sup> Undergraduate Research	3	
† CS 4234 <sup>4</sup> Parallel Computation	3	
† ECE 4424 <sup>4</sup> / CS 4824 <sup>4</sup> Machine Learning	3	
†MATH 3134 <sup>4</sup> Applied Combinatorics and Graph Theory	3	
†MATH 4144 <sup>4</sup> Linear Algebra II	3	
† MATH 4454 <sup>4</sup> Applied Mathematical Modeling	3	
† MATH 4225 <sup>4</sup> Elementary Real Analysis	3	
† ISE 4404 <sup>4</sup> Statistical Quality Control	3	

<b>IV. Free Electives (13 credits)</b>
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### **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 and Comments**

<sup>1</sup>For transfer students from Computer Science, CS 1705 may substitute for CS 1064.

<sup>2</sup>For Economic majors or minors, ECON 4304, Introduction to Econometric Methods, can substitute for STAT 4804.

<sup>3</sup>A maximum of 3 credits from either 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>4</sup>An upper-level course that is not offered by the Department of Statistics. Be aware of *all* prerequisites.

Note: CMDA 2005-2006 is equivalent to all the following: STAT 3005 **AND** STAT 3006 **AND** STAT 3104 **AND** (MATH 2214 OR MATH 2214H) **AND** (MATH 2204 OR MATH 2204H)

### **Satisfactory Progress Towards Degree and Minimum Grade Requirements**

- It is recommended that, upon attempting 72 credit hours, students will have completed STAT 3005, MATH 1225, 1226, 2114, 2204, and CS 1064 or 1114.
- Upon having attempted 90 semester credits, students must have an in-major GPA of 2.0 or better.
- 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).

### **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 statistics major as outlined in this check-sheet. 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). In addition, students must have an in-major GPA of 2.0 or greater. All STAT courses, any course taken to fulfill Statistical Methods and Theory option elective credit, and all required MATH and CS courses will be used to calculate in-major GPA. If 120 credit hours are reached and a student does not meet the GPA requirement, the student must take additional STAT courses to raise the in-major GPA to a 2.0.