

ENVIRONMENTAL DATA SCIENCE MAJOR

Program Curriculum

Code	Title	Credits
Degree Core Requirements		
FREC 2214	Introduction to Land and Field Measurements	3
FREC 2314	Forest Biology and Dendrology	2
FREC 2324	Dendrology Laboratory	1
FREC 2614	Human-Environment Systems	3
FREC 4004	Professional Skills in Natural Resources	1
FREC/NR 4014	Natural Resources Economics	3
FREC 4114	Information Technologies for Natural Resource Management	3
FREC 4434	Natural Resource Policy	3
Subtotal		19
Major Requirements		
<i>Computational Requirements</i>		
BIT 3424	Introduction to Business Analytics Modeling	3
BIT 3514	Systems Analysis	3
BIT 3524	Database Management and Design	3
FREC 1044	Introduction to Environmental Data Science	3
FREC 3044	Environmental Data Science	3
FREC 4044	Environmental Data Science Capstone	3
FREC 4214	Forest Photogrammetry and Spatial Data Processing	3
Select one of the following:		3-4
FREC 4244	Hydroinformatics	
FREC 3214 & FREC 3224	Forest Biometrics and Forest Measurements Field Laboratory	
<i>Computer Programming Requirement</i>		
Select one of the following:		3
CS 1044	Introduction to Programming in C	
CS 1064	Introduction to Programming in Python	
CS 1114	Introduction to Software Design	
<i>Advanced Data Science Skills Requirement</i>		
Select one of the following:		3
STAT 3616	Biological Statistics	
MATH 2114	Introduction to Linear Algebra	
CS 2064	Intermediate Programming in Python	
BIOL 1115	Principles of Biology Laboratory	1
BIOL 1116	Principles of Biology Laboratory	1
FREC 2004	Forest Ecosystems	3
Subtotal		35-36
Free Electives		
Select additional credit hours to total at least 120		19-21
Subtotal		19-21
Pathways to General Education		
<i>Pathways Concept 1 - Discourse</i>		
COMM 1015	Communication Skills (1F)	3

or ENGL 1105 First-Year Writing		
COMM 1016	Communication Skills (1F)	3
or ENGL 1106 First-Year Writing		
Select three credits in Pathway 1a (https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G01A)		3
<i>Pathways Concept 2 - Critical Thinking in the Humanities</i>		
Select six credits of Pathway 2 (https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G02)		6
<i>Pathways Concept 3 - Reasoning in the Social Sciences</i>		
AAEC 1005	Economics of the Food and Fiber System	3
or ECON 2005 Principles of Economics		
Select three additional credits		3
<i>Pathways Concept 4 - Reasoning in the Natural Sciences</i>		
BIOL 1105	Principles of Biology	3
BIOL 1106	Principles of Biology	3
<i>Pathways Concept 5 - Quantitative and Computational Thinking</i>		
MATH 1025	Elementary Calculus (5F)	3-4
or MATH 1225 Calculus of a Single Variable		
MATH 1026	Elementary Calculus (5F)	3-4
or MATH 1226 Calculus of a Single Variable		
STAT 3615	Biological Statistics (5A)	3
<i>Pathways Concept 6 - Critique and Practice in Design and the Arts</i>		
Select three credits in Pathway 6d (https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G06D)		3
Select three credits in Pathway 6a (https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G06A)		3
<i>Pathways Concept 7 - Critical Analysis of Identity and Equity in the United States¹</i>		
Select three credits in Pathway 7 (https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G07)		3
Subtotal		45-47
Total Credits		118-123

¹ A course taken to satisfy another area of Pathways that is also listed within Concept 7 will satisfy the Concept 7 requirement simultaneously.

Minimum credit hours required for graduation is 120. Prerequisites or enrollment restrictions may apply to some courses. Consult the undergraduate course catalog or the timetable of classes.

Environmental Informatics Notes

1. **Satisfactory Progress:** By the end of the semester in which the student has attempted 60 hours (including transfer, advanced placement, advanced standing, and credit by examination), "satisfactory progress" towards a B.S. degree in Forest Resources and Environmental Conservation will include the following minimum criteria:

- Having an in-major and overall grade point average (GPA) of at least 2.0.
- Passing at least 24 semester credits that apply to Pathways for General Education
- Passing the following courses, or their equivalents: BIOL 1105 Principles of Biology, BIOL 1106 Principles of Biology and BIOL 1115 Principles of Biology Laboratory, BIOL 1116 Principles of Biology Laboratory; MATH 1025 Elementary Calculus or MATH 1225 Calculus of a Single Variable.

2. **Foreign Language Requirement:** A sequence of two (2) foreign language courses is required for graduation unless two (2) high school credits of the same foreign language or six (6) transfer credit hours of foreign language have been earned. These credits do not count toward graduation. See catalog section on "Graduation Requirements."
3. **Policy on Student Exchange:** If studying overseas or at another U.S. university, begin planning at least 9 months prior to your departure to allow time to determine what substitutions, if any, will be allowed and to arrange your schedule to ensure that all requirements for graduation will be met.
4. **In-major GPA Computation:** All degree core and Environmental Informatics major requirements will factor into the in-major GPA.
5. **Curriculum Planning:** Students should plan early with their advisors to determine appropriate sequences for their courses. Some courses must be taken in sequence to satisfy prerequisites.
6. **Degree Requirements:** An in-major and overall GPA of 2.0 is required for graduation. Minimum hours for degree is 120.
7. In accordance with university guidelines, courses stratifying degree core requirements may not be double counted to satisfy other areas of a degree (e.g. Pathways requirements).
8. **Prerequisites:** Some of the listed courses have prerequisites. Be sure to consult with the University Catalog or check with your advisor.
9. **Acceptable Substitutions:** The following requirements have acceptable substitutions.
 - a. STAT 3615 Biological Statistics: STAT 3005 Statistical Methods
 - b. BIOL 1105 Principles of Biology: CHEM 1035 General Chemistry
 - c. BIOL 1115 Principles of Biology Laboratory: CHEM 1046 General Chemistry Laboratory