

# ATMOSPHERIC SCIENCES, BS

Banner Code: SC-BS-AOES

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The undergraduate program in atmospheric sciences gives students a strong quantitative undergraduate education in atmospheric, climate, and related sciences to understand the basic principles behind current and emerging issues in weather, climate variability, and climate change. Students completing the atmospheric sciences degree will be prepared for a full range of career paths including forecast and analysis, operations and research support in meteorology, numerical weather prediction, data analytics, and climate. The curriculum meets the American Meteorological Society's (<https://www.ametsoc.org/ams/>) recommendations for a bachelor's degree in atmospheric sciences.

## Admissions & Policies

### Admissions

University-wide admissions policies can be found in the Undergraduate Admissions Policies (<http://catalog.gmu.edu/admissions/undergraduate-policies/>) section of this catalog.

To apply for this program, please complete the George Mason University Admissions Application (<https://www2.gmu.edu/admissions-aid/apply-now/>).

### Policies

Students must fulfill all Requirements for Bachelor's Degrees (<http://catalog.gmu.edu/policies/academic/undergraduate-policies/#ap-5-3-2>), including the Mason Core (<http://catalog.gmu.edu/mason-core/>).

The university's writing intensive requirement for the major will be met upon successful completion of CLIM 408 Senior Research.

For policies governing all undergraduate degrees, see AP.5 Undergraduate Policies (<http://catalog.gmu.edu/policies/academic/undergraduate-policies/>).

## Requirements

### Degree Requirements

Total credits: minimum 120

This is a Green Leaf program.

Students should refer to the Admissions & Policies tab for specific policies related to this program.

A GPA of at least 2.00 is required for all core courses, with an overall GPA of at least 2.50.

### Atmospheric Sciences Core

Code	Title	Credits
CLIM 102	Introduction to Global Climate Change Science (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> )	4
CLIM 111	Introduction to the Fundamentals of Atmospheric Science (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> )	3
CLIM 112	Introduction to the Fundamentals of Atmospheric Science Lab (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> )	1
CLIM 301	Weather Analysis and Prediction	4
CLIM 408	Senior Research <sup>1</sup>	3
CLIM 411	Atmospheric Dynamics	3
CLIM 429	Atmospheric Thermodynamics	3
PHYS 475	Atmospheric Physics	3
Total Credits		24

<sup>1</sup> Fulfills the writing intensive requirement.

### Chemistry

Code	Title	Credits
CHEM 211	General Chemistry I (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> )	3
CHEM 213	General Chemistry Laboratory I (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> )	1
Total Credits		4

### Computer Science

Code	Title	Credits
Select one of the following:		3-4
CDS 130	Computing for Scientists	
CS 112	Introduction to Computer Programming <sup>1</sup>	
Total Credits		3-4

<sup>1</sup> Students selecting CS 112 Introduction to Computer Programming must take an additional information technology ethics course in order to completely fulfill the Mason Core Information Technology (<http://catalog.gmu.edu/mason-core/#information-technology>) requirement. Recommended courses include either CDS 151 Data Ethics in an Information Society (Mason Core) (<http://catalog.gmu.edu/mason-core/>) or CS 105 Computer Ethics and Society (Mason Core) (<http://catalog.gmu.edu/mason-core/>).

### Mathematics

Code	Title	Credits
MATH 113	Analytic Geometry and Calculus I (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> )	4
MATH 114	Analytic Geometry and Calculus II	4
MATH 213	Analytic Geometry and Calculus III	3
Total Credits		11

## Statistics

Code	Title	Credits
STAT 250	Introductory Statistics I (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> )	3
Total Credits		3

## Physics

Code	Title	Credits
PHYS 160	University Physics I (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> )	3
PHYS 161	University Physics I Laboratory (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> )	1
PHYS 260	University Physics II (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> )	3
PHYS 261	University Physics II Laboratory (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> )	1
Total Credits		8

## Options

Students in the atmospheric sciences major will select one of the following options in addition to the required courses above. These options reflect faculty expertise and provide two areas of research emphasis. The options will help in creating educated professionals who have the requisite training to support future weather and climate research, enabling the graduate's potential for providing substantial societal benefits.

### Meteorology Option

This option is designed for students who are primarily interested in weather and weather forecasting. The required classes in this option emphasize atmospheric phenomena, especially those that have the greatest impact on society.

Code	Title	Credits
CLIM 312	Physical Climatology	3
or GGS 312	Physical Climatology	
or CLIM 440	Climate Dynamics	
CLIM 314	Severe and Extreme Weather	3
or GGS 314	Severe and Extreme Weather	
CLIM 319	Air Pollution	3
or GGS 319	Air Pollution	
Total Credits		9

### Computational Atmospheric Sciences Option

The computational atmospheric sciences option gives students preparation in computational science, mathematics, and elements of numerical modeling in order to undertake quantitative research or operational work in a professional or graduate setting.

Code	Title	Credits
CLIM 470	Numerical Weather Prediction	3
MATH 214	Elementary Differential Equations	3
Select one from the following:		3
CDS 251	Introduction to Scientific Programming	

CDS 301	Scientific Information and Data Visualization	
CDS 302	Scientific Data and Databases	
CDS 303	Scientific Data Mining	
Total Credits		9

## Required Electives

The required electives must be chosen from this list and be independent of courses taken in the selected option (Meteorology or Computational Atmospheric Sciences):

Code	Title	Credits
Select 9 credits from the following:		
CDS 251	Introduction to Scientific Programming	9
CDS 301	Scientific Information and Data Visualization	
CLIM 312	Physical Climatology	
or GGS 312	Physical Climatology	
CLIM 314	Severe and Extreme Weather	
or GGS 314	Severe and Extreme Weather	
CLIM 319	Air Pollution	
or GGS 319	Air Pollution	
CLIM 409	Research Internship	
CLIM 412	Physical Oceanography	
CLIM 438	Atmospheric Chemistry	
CLIM 440	Climate Dynamics	
CLIM 456	Introduction to Atmospheric Radiation	
or GGS 456	Introduction to Atmospheric Radiation	
CLIM 470	Numerical Weather Prediction	
GEOL 420	Earth Science and Policy (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> )	
GGS 354	Data Analysis and Global Change Detection Techniques	
MATH 214	Elementary Differential Equations	
Total Credits		9

## Mason Core and Elective Credits

In order to meet a minimum of 120 credits, this degree requires an additional 48-49 credits (dependent upon the course chosen for the Computer Science requirement), which may be applied toward any remaining Mason Core (<http://catalog.gmu.edu/mason-core/>) requirements (outlined below), Requirements for Bachelor's Degrees (<http://catalog.gmu.edu/policies/academic/undergraduate-policies/#ap-5-3-2>), and electives. Students are strongly encouraged to consult with their advisors to ensure that they fulfill all requirements.

### Mason Core

Some Mason Core (<http://catalog.gmu.edu/mason-core/>) requirements may already be fulfilled by the major requirements listed above. Students are strongly encouraged to consult their advisors to ensure they fulfill all remaining Mason Core (<http://catalog.gmu.edu/mason-core/>) requirements.

Code	Title	Credits
<b>Foundation Requirements</b>		
	Written Communication (ENGH 101) ( <a href="http://catalog.gmu.edu/mason-core/#written">http://catalog.gmu.edu/mason-core/#written</a> )	3

Oral Communication ( <a href="http://catalog.gmu.edu/mason-core/#oral">http://catalog.gmu.edu/mason-core/#oral</a> )	3
Quantitative Reasoning ( <a href="http://catalog.gmu.edu/mason-core/#quantitative">http://catalog.gmu.edu/mason-core/#quantitative</a> )	3
Information Technology and Computing ( <a href="http://catalog.gmu.edu/mason-core/#information-technology">http://catalog.gmu.edu/mason-core/#information-technology</a> )	3
<b>Exploration Requirements</b>	
Arts ( <a href="http://catalog.gmu.edu/mason-core/#arts">http://catalog.gmu.edu/mason-core/#arts</a> )	3
Global Understanding ( <a href="http://catalog.gmu.edu/mason-core/#global">http://catalog.gmu.edu/mason-core/#global</a> )	3
Literature ( <a href="http://catalog.gmu.edu/mason-core/#literature">http://catalog.gmu.edu/mason-core/#literature</a> )	3
Natural Science ( <a href="http://catalog.gmu.edu/mason-core/#natural-science">http://catalog.gmu.edu/mason-core/#natural-science</a> )	7
Social and Behavioral Sciences ( <a href="http://catalog.gmu.edu/mason-core/#social-behavioral-science">http://catalog.gmu.edu/mason-core/#social-behavioral-science</a> )	3
Western Civilization/World History ( <a href="http://catalog.gmu.edu/mason-core/#western-civilization-world-history">http://catalog.gmu.edu/mason-core/#western-civilization-world-history</a> )	3
<b>Integration Requirements</b>	
Written Communications (ENGL 302) ( <a href="http://catalog.gmu.edu/mason-core/#written">http://catalog.gmu.edu/mason-core/#written</a> )	3
Writing-Intensive ( <a href="http://catalog.gmu.edu/mason-core/#wi">http://catalog.gmu.edu/mason-core/#wi</a> ) <sup>1</sup>	3
Synthesis/Capstone ( <a href="http://catalog.gmu.edu/mason-core/#synthesis-capstone">http://catalog.gmu.edu/mason-core/#synthesis-capstone</a> ) <sup>2</sup>	3
<b>Total Credits</b>	<b>40</b>

<sup>1</sup> Most programs include the writing-intensive course designated for the major as part of the major requirements; this course is therefore not counted towards the total required for Mason Core.

<sup>2</sup> Minimum 3 credits required.