

## Interested in This Major?

**Current Students:** Visit us in EMS Building, Room E403, call us at 414-229-4469 or email [evans36@uwm.edu](mailto:evans36@uwm.edu)

**Not a UWM Student yet?** Call our Admissions Counselor at 414-229-7711 or email [let-sci@uwm.edu](mailto:let-sci@uwm.edu)

**websites:** [uwm.edu/atmospheric-science](http://uwm.edu/atmospheric-science)  
<http://innovativeweather.com/>



## What is Atmospheric Science?

Atmospheric science is the study of short-term weather and long-term climate, involving activities such as weather forecasting, climate projections, air quality modeling, data analysis, and basic and applied research.

## The Program at UWM

Atmospheric Science is housed in the Department of Mathematical Sciences at UWM. This allows for students to receive the best-possible preparation to succeed in quantitative aspects of the discipline.

Students have access to excellent research and teaching facilities, including campus supercomputing facilities and a dedicated computer lab that features several of the same workstations used by National Weather Service forecasters. A student-to-faculty ratio of approximately 10:1 in core courses ensures close contact between students and faculty. Students learn from and have the opportunity to conduct hands-on research with faculty members who have expertise in areas such as weather analysis and forecasting, atmospheric dynamics, cloud physics, air pollution meteorology, and tropical and severe storms meteorology. Undergraduate students also have the ability to conduct research with faculty, intern with local television stations or the National Weather Service, and participate in our Innovative Weather program.

The program maintains strong ties with regional and national employers in both the private sector and at the National Weather Service, where many recent UWM graduates have found employment. Many undergraduates also have gone on to pursue graduate studies at UWM and elsewhere.

## INNOVATIVE WEATHER:

Innovative Weather is our 24/7 weather operation that serves radio, utility, corporate, and transportation clients, providing highly-customized forecasts on a subscription basis. We focus on understanding our clients' business needs and how weather can impact operations, staffing and profitability. Forecasts produced by Innovative Weather are designed to mitigate business risk for the client. Students who work at Innovative Weather gain hands-on experience in meteorology.

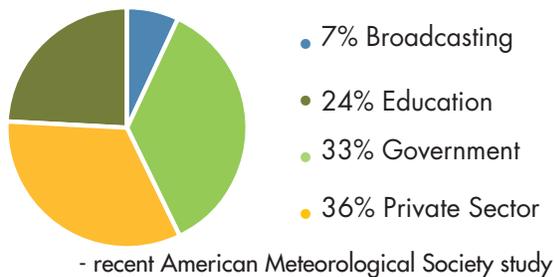
## Where do Atmospheric Scientists Work?

With the visibility of the Weather Channel, broadcast meteorology is omnipresent. However, many people are surprised to discover that this is only one of the many career opportunities in this field.

**Private Sector.** Consulting firms are the fastest growing employment sector in the atmospheric sciences. Here, meteorologists' work varies from radio to forecasting to air pollution meteorology to forensic meteorology to basic and applied research. Some graduates work in risk assessment for insurance firms, resource allocation for power companies and stock futures pricing for investment groups. Other graduates find related work in computer science and aviation. Private sector atmospheric scientists hold university degrees up to and including the doctoral level, although the majority end with a bachelor's degree.

**Federal Government.** Agencies such as NASA, NOAA and the EPA employ many meteorologists, working in both operations (forecasting) and research (climate studies, severe weather analysis, development of forecast tools, air pollution control). The Department of Defense, principally the Air Force and Navy, also employs many meteorologists in forecasting positions. Excluding the military, degree-holders within this sector are about evenly split between BS, MS and PhD.

## Where Atmospheric Scientists Work



**Local and State Governments.** Local and state governments employ meteorologists in a range of positions ranging from emergency management to air pollution monitoring. Most hold the BS or MS degree.

**Education.** Atmospheric scientists teach and conduct research in colleges and universities, and are science educators in the K-12 schools. At the university level, most positions require a doctoral degree. In K-12 schools, a BS degree (often with teaching certification) is required.

**Broadcast Meteorology.** The typical career path for these individuals begins at a small market television station before later advancing to larger markets and commensurately higher salaries. Broadcasters holding the American Meteorological Society seal of approval typically have a BS degree in Atmospheric Sciences.

Salaries vary according to employment sector, education level, experience and ability. According to surveys conducted by the American Meteorological Society, average salaries for private sector meteorologists with 3-5 years experience were \$43,000. In the government and education sectors, employees in the early stages of their careers had average salaries of \$42,100 and \$50,000, respectively. These salaries grew with experience to average maximum values of \$86,000 (private sector, excluding broadcasting), \$90,000 (government), \$97,000 (university) and \$111,000 (broadcasting).

### The Major

Students must take 34 preparatory credits and 33 credits from the core curriculum. To accommodate students with varying interests and to represent the breadth of the field, atmospheric science majors also choose at least 9 elective credits from a set of courses covering specialties in atmospheric sciences (such as microscale, mesoscale, and tropical meteorology, or data analytics), applied mathematics, and statistics.

The required preparatory classes are:	
Math 231 through 233	Calculus and Analytic Geometry I, II, and III
Math 234 or Math 240	Linear Algebra and Differential Equations or Matrices and Applications
Physics 209/214 and 210/215	Physics I and II (Calculus Treatment) with laboratories
CompSci 151	Intro to Scientific Programming in Fortran (note: only offered every other Spring)
Chem 102	General Chemistry
The core courses are:	
Atm Sci 240	Intro to Meteorology
Atm Sci 330	Air Pollution Meteorology
Atm Sci 350	Atmospheric Thermodynamics
Atm Sci 351/352	Dynamic Meteorology I and II
Atm Sci 360/361	Synoptic Meteorology I and II
Atm Sci 464	Cloud Physics
Atm Sci 511	Seminar in Atmospheric Radiation and Remote Sensing
Atm Sci 599	Capstone course
Math 320	Intro to Differential Equations

Since most of the courses in the program build on each other, students considering the Atmospheric Science major should consult with a department advisor as soon as possible. A student who misses one of the prerequisite classes when it is offered can experience delays in completing the program.

### The Minor

Students must complete at least 18 credits in atmospheric sciences, including Atm Sci 240 and 360. The remaining 12 credits must be Atm Sci classes at the 300-level or above.

### Combinations with other Fields

Atmospheric Sciences professionals work extensively with computers, and advanced, specialized training can have significant career benefits. An Atmospheric Science major can be profitably combined with coursework in geographic information studies (GIS), actuarial science, physics, chemistry, applied mathematics and statistics. A student can do this by majoring in Atmospheric Science and minoring in another field or by completing a double major.

### Programs and Events

UWM offers the world's first faculty-led study-abroad program in Atmospheric Science. In this course, students explore the effects of acid rain on Mexico's cultural heritage sites. The program has a very active Atmospheric Science Club, which holds many social and professional development activities throughout the academic year. Each year, the program hosts several world-renowned experts in the atmospheric sciences, and students can meet and interact with them in both formal and informal settings.





This sample four-year plan shows just one possible pathway to earning a degree with this major in four years. This plan **does not** replace the advice of your advisor, and students are cautioned to meet regularly with their advisor to create a personalized plan that matches their particular circumstances. This plan also follows the degree requirements for students who began their college education in Fall of 2013 or later. If you started college prior to Fall of 2013, your degree requirements may be different.

### Degree Requirements (brief summary):

- English Proficiency and UWM Oral and Written Communication (OWC) GER - English 102 (fulfills Part A) and one OWC-Part B course.
- Math Proficiency, UWM Quantitative Literacy (QL) GER, and Formal Reasoning - two courses will satisfy all three requirements for students pursuing a Bachelor of Science. At a minimum, Math through the first semester calculus and at least one other 200-level Math class will fulfill the degree requirement for all BS students. Additional math courses are required to fulfill requirements for the major.
- Foreign Language – 2 semesters of a single Foreign Language (may be satisfied through 2 years of a single Foreign Language in high school)
- L&S Humanities – 12 credits
- L&S Social Sciences – 12 credits
- L&S Natural Science – 12 credits including a laboratory course in three distinct natural science areas
- L&S International – 9 credits usually accomplished in conjunction with Humanities and/or Social Science courses
- UWM Arts GER – 3 credits
- UWM Cultural Diversity GER – 3 credits usually accomplished in conjunction with a Humanities or Social Science course
- 120 credits including 90 credits in L&S and with 36 of the 90 credits in L&S upper-level (numbered 300 and above) courses and 30 of those 36 credits in designated upper-level Natural Science
- Complete the Atmospheric Science major requirements
  - at least 15 upper-level credits in the major at the 300-level or above completed at UWM
  - Chem 102
  - All of Math 231, 232, 233, 320
  - Math 234 or 240
  - CompSci 151
  - All of Physics 209, 210, 214, and 215
  - All of AtmSci 240, 330, 350, 351, 352, 360, 361, 464, 511, and 599
  - 9 credits from Atm Sci 460, 470, 480, 497, 505, 690; Math 313, 314, 321, 322, 405, 413, 414, 416, 471, 521, 522, 535, 571, 581, 601, 602; MthStat 361, 362, 467, 563, 564

### Sample Four Year Plan:

There are hundreds of courses that satisfy various requirements and courses can count towards more than one requirement. For example, Chemistry 102 counts as a natural science with lab and counts towards the requirements for the major. (This sample assumes no high school Foreign Language was taken and that the student placed into college algebra/trigonometry and college-level English.)

	Semester 1	Semester 2
Year 1	Math 115	Math 231 (NS) (QL-B)
	English 101	L&S Social Science/ International
	Chem 102 (NS+)	English 102 (OWC-A)
	Atm Sci 100 (NS+)	1st semester Foreign Language
		Comp Sci 151 or Arts GER
Year 2	Physics 209/214 (NS+)	Physics 210/215 (NS+)
	Math 232 (NS)	Math 233 (NS)
	2nd semester Foreign Language	L&S Humanities/International
	OWC-B course	Arts GER or Comp Sci 151
	L&S Humanities/Cultural Diversity	Atm Sci 240 (NS)
Year 3	Atm Sci 351 (NS)	Atm Sci 352 (NS)
	Atm Sci 360 (NS)	Atm Sci 361 (NS)
	Math 234 or 240 (NS)	L&S Humanities
	L&S Humanities	Elective
	L&S Social Science/ International	Atm Sci or Math elective
Year 4	Atm Sci 330 (NS)	Atm Sci 464 (NS)
	Atm Sci 350 (NS)	Atm Sci 511 (NS)
	Atm Sci or Math elective	Atm Sci 599
	L&S Social Science	Atm Sci or Math elective
	Math 320 (NS)	L&S Social Science

(NS) Natural Sciences GER