ATMOSPHERIC AND OCEANIC SCIENCES, BS

REQUIREMENTS

UNIVERSITY GENERAL EDUCATION REQUIREMENTS

All undergraduate students at the University of Wisconsin-Madison are required to fulfill a minimum set of common university general education requirements to ensure that every graduate acquires the essential core of an undergraduate education. This core establishes a foundation for living a productive life, being a citizen of the world, appreciating aesthetic values, and engaging in lifelong learning in a continually changing world. Various schools and colleges will have requirements in addition to the requirements listed below. Consult your advisor for assistance, as needed. For additional information, see the university Undergraduate General Education Requirements (https://guide.wisc.edu/undergraduate/#requirementsforundergraduatestudytext) section of the Guide.

General Education	• Breadth—Humanities/Literature/Arts: 6 credits
	• Breadth—Natural Science: 4 to 6 credits, consisting of one 4- or 5-credit course with a laboratory component; or two courses providing a total of 6 credits
	• Breadth—Social Studies: 3 credits
	• Communication Part A & Part B *
	• Ethnic Studies *
	• Quantitative Reasoning Part A & Part B *

* The mortarboard symbol appears before the title of any course that fulfills one of the Communication Part A or Part B, Ethnic Studies, or Quantitative Reasoning Part A or Part B requirements.

COLLEGE OF LETTERS & SCIENCE DEGREE REQUIREMENTS: BACHELOR OF SCIENCE (BS)

Students pursuing a Bachelor of Science degree in the College of Letters & Science must complete all of the requirements below. The College of Letters & Science allows this major to be paired with either the Bachelor of Arts or the Bachelor of Science degree requirements.

BACHELOR OF SCIENCE DEGREE REQUIREMENTS

| Mathematics | Complete two courses of 3+ credits at the Intermediate or Advanced level in MATH, COMP SCI, or STAT subjects. A maximum of one course in each of COMP SCI and STAT subjects counts toward this requirement. |
| Language | Complete the third unit of a language other than English. |

L&S Breadth	Complete: • 12 credits of Humanities, which must include at least 6 credits of Literature; and • 12 credits of Social Science; and • 12 credits of Natural Science, which must include 6 credits of Biological Science and 6 credits of Physical Science.
Liberal Arts and Science Coursework	Complete at least 108 credits.
Depth of Intermediate/ Advanced Coursework	Complete at least 60 credits at the Intermediate or Advanced level.
Major	Declare and complete at least one major.
Total Credits	Complete at least 120 credits.
UW-Madison Experience	Complete both: • 30 credits in residence, overall, and • 30 credits in residence after the 86th credit.
Quality of Work	• 2.000 in all coursework at UW–Madison • 2.000 in Intermediate/Advanced level coursework at UW–Madison

NON–L&S STUDENTS PURSUING AN L&S MAJOR

Non–L&S students who have permission from their school/college to pursue an additional major within L&S only need to fulfill the major requirements. They do not need to complete the L&S Degree Requirements above.

REQUIREMENTS FOR THE MAJOR

Code	Title	Credits
Calculus (complete all):		
MATH 221	Calculus and Analytic Geometry 1	5
MATH 222	Calculus and Analytic Geometry 2	4
MATH 234	Calculus--Functions of Several Variables	4
Physics (complete one course from each group):		
PHYSICS 207	General Physics	5
or PHYSICS 201	General Physics	
or PHYSICS 247	A Modern Introduction to Physics	
PHYSICS 208	General Physics	5
or PHYSICS 202	General Physics	
or PHYSICS 248	A Modern Introduction to Physics	
Computer Sciences (complete one):		**3**
COMP SCI 220	Data Science Programming I	
COMP SCI 310	Problem Solving Using Computers	
COMP SCI 320	Data Science Programming II	
COMP SCI/ E C E 354	Machine Organization and Programming	
COMP SCI 412	Introduction to Numerical Methods	
COMP SCI/I SY E/ MATH 425	Introduction to Combinatorial Optimization	
Total Credits		**26**

Code	Title	Credits
Core Sequence (complete all):		
ATM OCN 310	Dynamics of the Atmosphere and Ocean I	3
ATM OCN 311	Dynamics of the Atmosphere and Ocean II	3
ATM OCN 330	Physics of the Atmosphere and Ocean I	3
ATM OCN 340	Physics of the Atmosphere and Ocean II	3
Quantitative Analysis (complete one):		**3**
COMP SCI 412	Introduction to Numerical Methods	
COMP SCI/ MATH/STAT 475	Introduction to Combinatorics	
COMP SCI/ MATH 514	Numerical Analysis	
COMP SCI/I SY E/ MATH/STAT 525	Linear Optimization	
MATH/STAT 309	Introduction to Probability and Mathematical Statistics I	
MATH/STAT 310	Introduction to Probability and Mathematical Statistics II	
MATH 319	Techniques in Ordinary Differential Equations	
MATH 320	Linear Algebra and Differential Equations	
MATH 321	Applied Mathematical Analysis 1: Vector and Complex Calculus	
MATH 322	Applied Mathematical Analysis 2: Partial Differential Equations	
MATH 331	Introductory Probability	
MATH 340	Elementary Matrix and Linear Algebra	
MATH 341	Linear Algebra	
MATH 375	Topics in Multi-Variable Calculus and Linear Algebra	
MATH 376	Topics in Multi-Variable Calculus and Differential Equations	
MATH 407	Topics in Mathematics Study Abroad	
MATH 415	Applied Dynamical Systems, Chaos and Modeling	
MATH 421	The Theory of Single Variable Calculus	
MATH/ COMP SCI/ I SY E 425	Introduction to Combinatorial Optimization	
MATH/STAT 431	Introduction to the Theory of Probability	
MATH/ COMP SCI/ E C E 435	Introduction to Cryptography	
MATH 443	Applied Linear Algebra	
MATH 461	College Geometry I	
MATH 467	Introduction to Number Theory	
MATH/ CURRIC 471	Mathematics for Secondary School Teachers	
MATH/ HIST SCI 473	History of Mathematics	
MATH/ COMP SCI/ STAT 475	Introduction to Combinatorics	
MATH 490	Undergraduate Seminar	
MATH 491	Topics in Undergraduate Mathematics	
MATH/ COMP SCI 513	Numerical Linear Algebra	
MATH/ COMP SCI 514	Numerical Analysis	
MATH 519	Ordinary Differential Equations	
MATH 521	Analysis I	
MATH 522	Analysis II	
MATH/ COMP SCI/I SY E/ STAT 525	Linear Optimization	
MATH 531	Probability Theory	
MATH 535	Mathematical Methods in Data Science	
MATH 540	Linear Algebra II	
MATH 541	Modern Algebra	
MATH 542	Modern Algebra	
MATH 551	Elementary Topology	
MATH 552	Elementary Geometric and Algebraic Topology	
MATH 561	Differential Geometry	
MATH 567	Modern Number Theory	
MATH 570	Fundamentals of Set Theory	
MATH/ PHILOS 571	Mathematical Logic	
MATH 607	Topics in Mathematics Study Abroad	
MATH/B M I/ BIOCHEM/ BMOLCHEM 609	Mathematical Methods for Systems Biology	
MATH 619	Analysis of Partial Differential Equations	
MATH 621	Introduction to Manifolds	
MATH 623	Complex Analysis	
MATH 627	Introduction to Fourier Analysis	
MATH 629	Introduction to Measure and Integration	
MATH/I SY E/ OTM/STAT 632	Introduction to Stochastic Processes	
STAT/MATH 309	Introduction to Probability and Mathematical Statistics I	
STAT/MATH 310	Introduction to Probability and Mathematical Statistics II	
STAT 311	Introduction to Theory and Methods of Mathematical Statistics I	
STAT 312	Introduction to Theory and Methods of Mathematical Statistics II	
STAT 324	Introduction to Statistics for Science and Engineering	

STAT 333	Applied Regression Analysis
STAT 340	Data Science Modeling II
STAT 349	Introduction to Time Series
STAT 351	Introductory Nonparametric Statistics
STAT 360	Topics in Statistics Study Abroad
STAT 371	Introductory Applied Statistics for the Life Sciences
STAT 411	An Introduction to Sample Survey Theory and Methods
STAT 421	Applied Categorical Data Analysis
STAT/M E 424	Statistical Experimental Design
STAT/MATH 431	Introduction to the Theory of Probability
STAT 456	Applied Multivariate Analysis
STAT 461	Financial Statistics
STAT/COMP SCI 471	Introduction to Computational Statistics
STAT/COMP SCI/MATH 475	Introduction to Combinatorics
STAT 479	Special Topics in Statistics
STAT/COMP SCI/I SY E/MATH 525	Linear Optimization
STAT/B M I 541	Introduction to Biostatistics
STAT/B M I 542	Introduction to Clinical Trials I
STAT/F&W ECOL 571	Statistical Methods for Bioscience I
STAT/F&W ECOL 572	Statistical Methods for Bioscience II
STAT 575	Statistical Methods for Spatial Data
STAT 601	Statistical Methods I
STAT 602	Statistical Methods II
STAT 605	Data Science Computing Project
STAT 609	Mathematical Statistics I
STAT 610	Introduction to Statistical Inference
STAT 615	Statistical Learning
STAT 627	Professional Skills in Data Science
STAT 628	Data Science Practicum
STAT/I SY E/MATH/OTM 632	Introduction to Stochastic Processes
STAT/B M I 641	Statistical Methods for Clinical Trials
STAT/B M I 642	Statistical Methods for Epidemiology
STAT 679	Special Topics in Statistics
STAT 681	Senior Honors Thesis
STAT 682	Senior Honors Thesis
Capstone	
ATM OCN 405	AOS Senior Capstone Seminar	1
Electives		**11**
ATM OCN 401	Topics in Meteorology
ATM OCN 404	Meteorological Measurements
ATM OCN 425	Global Climate Processes
ATM OCN 441	Radar and Satellite Meteorology

ATM OCN 452	Synoptic Laboratory I: The Frontal Cyclone
ATM OCN 453	Synoptic Laboratory II: Mesoscale Meteorology
ATM OCN/ENVIR ST 520	Bioclimatology
ATM OCN 522	Tropical Meteorology
ATM OCN/PLANTSCI 532	Environmental Biophysics
ATM OCN 573	Research Computing in Atmospheric and Oceanic Sciences
ATM OCN 575	Climatological Analysis
ATM OCN 610	Geophysical Fluid Dynamics I
ATM OCN 611	Geophysical Fluid Dynamics II
ATM OCN 630	Introduction to Atmospheric and Oceanic Physics
ATM OCN 637	Cloud Physics
ATM OCN 640	Radiation in the Atmosphere and Ocean
ATM OCN 660	Introduction to Physical Oceanography
ATM OCN 681	Senior Honors Thesis
ATM OCN 682	Senior Honors Thesis
ATM OCN 691	Senior Thesis
ATM OCN 692	Senior Thesis
ATM OCN 698	Directed Study [2]
ATM OCN 699	Directed Study [2]
Total Credits		**27**

RESIDENCE AND QUALITY OF WORK

- 2.000 GPA in all ATM OCN and major courses
- 2.000 GPA on 15 upper-level credits in the major, taken in Residence. [3]
- 15 credits in ATM OCN, taken on campus

HONORS IN THE MAJOR

Students may declare Honors in the Atmospheric and Oceanic Sciences Major in consultation with the Atmospheric and Oceanic Sciences undergraduate advisor.

REQUIREMENTS

To earn Honors in the Major in Atmospheric and Oceanic Sciences, students must satisfy both the requirements for the major (above) and the following additional requirements:

- Earn a 3.300 University GPA
- Earn a 3.400 GPA for all ATM OCN courses, and all courses accepted in the major
- Complete the following additional coursework:
  - ATM OCN 610 or ATM OCN 611 and
  - ATM OCN 681 and ATM OCN 682 for a total of 6 credits

FOOTNOTES

[1] Note that core sequence begins in the fall semester only.

2   A maximum 2 credits of Electives may come from Internship or Directed
    Study courses.
3   ATM OCN 300 through ATM OCN 699 are upper-level in the major.

UNIVERSITY DEGREE REQUIREMENTS

Total Degree	To receive a bachelor's degree from UW–Madison, students must earn a minimum of 120 degree credits. The requirements for some programs may exceed 120 degree credits. Students should consult with their college or department advisor for information on specific credit requirements.
Residency	Degree candidates are required to earn a minimum of 30 credits in residence at UW–Madison. "In residence" means on the UW–Madison campus with an undergraduate degree classification. "In residence" credit also includes UW–Madison courses offered in distance or online formats and credits earned in UW–Madison Study Abroad/Study Away programs.
Quality of Work	Undergraduate students must maintain the minimum grade point average specified by the school, college, or academic program to remain in good academic standing. Students whose academic performance drops below these minimum thresholds will be placed on academic probation.