

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 (<http://guide.wisc.edu/undergraduate/#requirementsforundergraduatestudytext>) section of the *Guide*.

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| General Education | <ul style="list-style-type: none"> • 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 * |
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* 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.

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| Liberal Arts and Science Coursework | Complete at least 108 credits. |
| Depth of 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: <ul style="list-style-type: none"> • 30 credits in residence, overall, and • 30 credits in residence after the 86th credit. |
| Quality of Work | <ul style="list-style-type: none"> • 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 |
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| 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 | 3 |
| COMP SCI 310 | Problem Solving Using Computers | |
| COMP SCI 320 | Data Science Programming II | |
| COMP SCI/ E C E 354 | Machine Organization and Programming | 3 |
| COMP SCI 412 | Introduction to Numerical Methods | |
| COMP SCI/ I SY E/ MATH 425 | Introduction to Combinatorial Optimization | 3 |

Total Credits

26

| Code | Title | Credits | | |
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| Core Sequence (complete all): | | | MATH/ HIST SCI 473 | History of Mathematics |
| ATM OCN 310 | Dynamics of the Atmosphere and Ocean I | 3 | MATH/ COMP SCI/ STAT 475 | Introduction to Combinatorics |
| ATM OCN 311 | Dynamics of the Atmosphere and Ocean II | 3 | MATH 490 | Undergraduate Seminar |
| ATM OCN 330 | Physics of the Atmosphere and Ocean I | 3 | MATH 491 | Topics in Undergraduate Mathematics |
| ATM OCN 340 | Physics of the Atmosphere and Ocean II | 3 | MATH/ COMP SCI 513 | Numerical Linear Algebra |
| Quantitative Analysis (complete one): | | | MATH/ COMP SCI 514 | Numerical Analysis |
| COMP SCI 412 | Introduction to Numerical Methods | | MATH 519 | Ordinary Differential Equations |
| COMP SCI/ MATH/STAT 475 | Introduction to Combinatorics | | MATH 521 | Analysis I |
| COMP SCI/ MATH 514 | Numerical Analysis | | MATH 522 | Analysis II |
| COMP SCI/I SY E/ MATH/STAT 525 | Linear Optimization | | MATH/ COMP SCI/I SY E/ STAT 525 | Linear Optimization |
| MATH/STAT 309 | Introduction to Probability and Mathematical Statistics I | | MATH 531 | Probability Theory |
| MATH/STAT 310 | Introduction to Probability and Mathematical Statistics II | | MATH 535 | Mathematical Methods in Data Science |
| MATH 319 | Techniques in Ordinary Differential Equations | | MATH 540 | Linear Algebra II |
| MATH 320 | Linear Algebra and Differential Equations | | MATH 541 | Modern Algebra |
| MATH 321 | Applied Mathematical Analysis | | MATH 542 | Modern Algebra |
| MATH 322 | Applied Mathematical Analysis | | MATH 551 | Elementary Topology |
| MATH 331 | Introductory Probability | | MATH 552 | Elementary Geometric and Algebraic Topology |
| MATH 340 | Elementary Matrix and Linear Algebra | | MATH 561 | Differential Geometry |
| MATH 341 | Linear Algebra | | MATH 567 | Modern Number Theory |
| MATH 375 | Topics in Multi-Variable Calculus and Linear Algebra | | MATH 570 | Fundamentals of Set Theory |
| MATH 376 | Topics in Multi-Variable Calculus and Differential Equations | | MATH/ PHILOS 571 | Mathematical Logic |
| MATH 407 | Topics in Mathematics Study Abroad | | MATH 605 | |
| MATH 415 | Applied Dynamical Systems, Chaos and Modeling | | MATH 607 | Topics in Mathematics Study Abroad |
| MATH 421 | The Theory of Single Variable Calculus | | MATH/B M I/ BIOCHEM/ BMOLCHEM 609 | Mathematical Methods for Systems Biology |
| MATH/ COMP SCI/ I SY E 425 | Introduction to Combinatorial Optimization | | MATH 619 | Analysis of Partial Differential Equations |
| MATH/STAT 431 | Introduction to the Theory of Probability | | MATH 621 | Introduction to Manifolds |
| MATH/ COMP SCI/ E C E 435 | Introduction to Cryptography | | MATH 623 | Complex Analysis |
| MATH 441 | | | MATH 627 | Introduction to Fourier Analysis |
| MATH 443 | Applied Linear Algebra | | MATH 629 | Introduction to Measure and Integration |
| MATH 461 | College Geometry I | | MATH/I SY E/ OTM/STAT 632 | Introduction to Stochastic Processes |
| MATH 467 | Introduction to Number Theory | | STAT/MATH 309 | Introduction to Probability and Mathematical Statistics I |
| MATH/ CURRIC 471 | Mathematics for Secondary School Teachers | | 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 |

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| STAT 324 | Introductory Applied Statistics for Engineers |
| 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

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| ATM OCN 405 | AOS Senior Capstone Seminar | 1 |
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Electives 11

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| ATM OCN 401 | Topics in Meteorology |
| ATM OCN 404 | Meteorological Measurements |
| ATM OCN 425 | Global Climate Processes |

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| 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/ AGRONOMY/ SOIL SCI 532 | Environmental Biophysics |
| ATM OCN 535 | |
| ATM OCN 573 | Computational Methods 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 615 | |
| ATM OCN 630 | Introduction to Atmospheric and Oceanic Physics |
| ATM OCN 637 | Cloud Physics |
| ATM OCN 638 | |
| ATM OCN 640 | Radiation in the Atmosphere and Ocean |
| ATM OCN 651 | |
| 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.