METEOROLOGY-CLIMATOLOGY

Description

The Department of Earth and Atmospheric Sciences offers a bachelor of science (BS) degree only with a major in meteorology-climatology. This degree program is comprehensive, but flexible so that you can pursue your own interests within the broad field of atmospheric sciences while meeting the federal government requirements for employment as a meteorologist. If you choose to further your education, your degree also prepares you for graduate school in the atmospheric sciences and related fields.

The major in meteorology-climatology fulfills the recommended curriculum of the American Meteorological Society (AMS) and the University Corporation for Atmospheric Research (UCAR). The major and degree also meets or exceeds the minimum hiring requirements for employment as a meteorologist with the Federal government, thus preparing you for employment with federal agencies such as the National Weather Service, National Aeronautics and Space Administration, Environmental Protection Agency, National Park Service, and military. With this major, you can also work in private weather consulting; broadcast meteorology; and the agriculture, education, and energy sectors.

The University of Nebraska–Lincoln is a member of UCAR.

Learning Outcomes

Graduates with a major in meteorology-climatology will be able to:

1. Explain fundamental atmospheric processes and develop conceptual models of the atmosphere, as well as its interaction with other components of the Earth system.
2. Analyze and interpret weather and climate data using mathematical, statistical, and computer programming tools.
3. Synthesize a broad understanding of basic weather and climate processes and system-scale interactions to generate short- and long-term predictions of the weather and climate.
4. Integrate disciplinary knowledge, technical proficiency, information collection, and data synthesis and analysis to conduct and interpret scientific research.
5. Communicate weather and climate information to diverse audiences using multi-media presentations and written scientific reports.

Academic and Career Advising

Academic and Career Advising Center

Not sure where to go or who to ask? The Advising Center team in 107 Oldfather Hall can help. The Academic and Career Advising Center is the undergraduate hub for CAS students in all majors. Centrally located and easily accessed, students encounter friendly, knowledgeable people who are eager to help or connect students to partner resources. Students also visit the Advising Center in 107 Oldfather Hall to:

- Choose or change their major, minor, or degree program.
- Check on policies, procedures, and deadlines.
- Get a college approval signature from the Dean's representatives.

CAS Career Coaches are available by appointment (in-person or Zoom) and located in the CAS Academic and Career Advising Center, 107 Oldfather Hall. They help students explore majors and minors, gain experience, and develop a plan for life after graduation.

Assigned Academic Advisors

Academic advisors are critical resources dedicated to students' academic, personal, and professional success. Every CAS student is assigned an academic advisor based on their primary major. Since most CAS students have more than just a single major, it is important to get to know the advisor for any minors or additional majors. Academic advisors work closely with the faculty to provide the best overall support and the discipline specific expertise. They are available for appointments (in-person or Zoom) and through weekly virtual drop-ins. Assigned advisors are listed in MyRED (https://its.unl.edu/myunl/) and their offices may be located in or near the department of the major for which they advise.

Students who have declared a pre-health or pre-law area of interest will also work with advisors in the Exploratory and Pre-Professional Advising Center (Explore Center) in 127 Love South, who are specially trained to guide students preparing to enter a professional school.

For complete and current information on advisors for majors, minors, or pre-professional areas, visit https://cas.unl.edu/major-advisors (https://cas.unl.edu/major-advisors/), or connect with the Arts and Sciences Academic and Career Advising Center, 107 Oldfather Hall, 402-472-4190, casadvising@unl.edu.

Career Coaching

The College believes that **Academics + Experience = Opportunities** and encourages students to complement their academic preparation with real-world experience, including internships, research, education abroad, service, and leadership. Arts and sciences students have access to a powerful network of faculty, staff, and advisors dedicated to providing information and support for their goals of meaningful employment or advanced education. Arts and sciences graduates have unlimited career possibilities and carry with them important career competencies—communication, critical thinking, creativity, context, and collaboration. They have the skills and adaptability that employers universally value. Graduates are prepared to effectively contribute professionally and personally with a solid foundation to excel in an increasingly global, technological, and interdisciplinary world.

Students should contact the career coaches in the Arts and Sciences Academic and Career Advising Center in 107 Oldfather Hall, or their assigned advisor, for more information. The CAS career coaches help students explore career options, identify ways to build experience and prepare to apply for internships, jobs, or graduate school, including help with resumes, applications, and interviewing.

ACE Requirements

Students must complete one course for each of the ACE Student Learning Outcomes below. Certified course choices are published in the degree audit, or visit the ACE (http://ace.unl.edu) website (http://ace.unl.edu) for the most current list of certified courses.

ACE Student Learning Outcomes
ACE 1: Write texts, in various forms, with an identified purpose, that respond to specific audience needs, integrate research or existing knowledge, and use applicable documentation and appropriate conventions of format and structure.
ACE 2: Demonstrate competence in communication skills.

ACE 3: Use mathematical, computational, statistical, logical, or other formal reasoning to solve problems, draw inferences, justify conclusions, and determine reasonableness.

ACE 4: Use scientific methods and knowledge to pose questions, frame hypotheses, interpret data, and evaluate whether conclusions about the natural and physical world are reasonable.

ACE 5: Use knowledge, historical perspectives, analysis, interpretation, critical evaluation, and the standards of evidence appropriate to the humanities to address problems and issues.

ACE 6: Use knowledge, theories, and research perspectives such as statistical methods or observational accounts appropriate to the social sciences to understand and evaluate social systems or human behaviors.

ACE 7: Use knowledge, theories, or methods appropriate to the arts to understand their context and significance.

ACE 8: Use knowledge, theories, and analysis to explain ethical principles and their importance in society.

ACE 9: Exhibit global awareness or knowledge of human diversity through analysis of an issue.

ACE 10: Generate a creative or scholarly product that requires broad knowledge, appropriate technical proficiency, information collection, synthesis, interpretation, presentation, and reflection.

College Degree Requirements

College Distribution Requirements

The College of Arts and Sciences distribution requirements are designed to ensure a range of courses across disciplines within the College. Students develop the ability to learn in a variety of ways and apply their knowledge from a variety of perspectives. All requirements are in addition to University ACE requirements, and no course can be used to fulfill both an ACE outcome and a College Distribution Requirement.

- A student may not use a single course to satisfy more than one College Distribution Requirement, with the exception of CDR Diversity. Courses used to meet CDR Diversity may also meet CDR Writing, CDR Humanities, or CDR Social Science.
- Internship (395 or 495), independent study or readings (396 or 496), research (398 or 498), and thesis (399, 399H, 499, or 499H) will not satisfy distribution requirements.
- Other courses with a 9 in the middle number (ex. PSYC 292) will not satisfy distribution requirements unless approved by an advisor.
- Cross-listed courses from interdisciplinary programs will be applied in the same area as courses from the lead department.

CDR: Written Communication

Select from courses approved for ACE outcome 1.

CDR: Natural, Physical, and Mathematical Sciences [1]

Select a course from ASTR, BIOS, CHEM, GEOL, LIFE, METR, MATH, PHYS, or ANTH 242, GEOG 155, GEOG 281, POLS 250, or PSYC 273.

CDR: Laboratory [2]

Laboratory courses may be embedded in a 4-5 credit course used in CDR Natural, Physical, and Mathematical Science (example GEOG 155), or stand alone (example LIFE 120L).

CDR: Humanities [3]

Select a course from ARAB, CHIN, CLAS, CZEC, ENGL, FILM, FREN, GERM, GREK, HIST, JAPN, LATN, PHIL, RELG, RUSS, or SPAN.

CDR: Social Science [4]

Select a course from ANTH, COMM, GEOG, NSST, POLS, PSYC, or SOCI.

CDR: Human Diversity in U.S. Communities

Select from the following approved courses also listed in your degree audit: ANTH 130, ANTH 412, ANTH 447, ANTH 473, ARAB/RELG 313, COMM 311, COMM 315, COMM/ETHN 335, COMM 364, COMM/ETHN 365, COMM 465, ENGL/WMNS 212, ENGL/ETHN 245N, ENGL/WMNS 312, ENGL/ETHN 345D, ENGL/ETHN/WMNS 345N, ENGL/ETHN 346, ENGL 376, ENGL 380, ENGL/ETHN 445, ETHN 100, ETHN 201, ETHN 202, ETHN 204, ETHN 484, FILM/ETHN 344, GEOG 271, GEOG 403, GLST/ANTH/MODL 214, GLST 350, HIST/ETHN/WMNS 115, HIST/ETHN 234, HIST/ETHN 246, HIST 251, HIST/ETHN 340, HIST 351/ETHN 341, HIST/ETHN/WMNS 356, HIST/ETHN 357, HIST/WMNS 402, HRHA 350, MODL 260, PHIL 105, PHIL 106, PHIL/WMNS 218, PHIL 323, PHIL 325, POLS/ETHN 333, POLS/WMNS 338, POLS 340, POLS 347, POLS 433, PSYC/ETHN 310, PSYC 330, PSYC/WMNS 421, PSYC/ETHN 425, RELG/HIST 134, RELG/ETHN/HIST 226, RELG/HIST 227, SOCI 101, SOCI 180, SOCI/WMNS 200, SOCI/ETHN 217, SPAN 206, SPAN 486, WMNS 101, WMNS 201, WMNS 202, WMNS 210

CDR: Language

BA Students [5]

Fulfilled by the completion of the 4th level of a single language (either in H.S. or in college). Language study at UNL is available in: ARAB, CHIN, CZEC, FREN, GERM, GREK, JAPN, LATN, SPAN, or SLPA.

BS Students [6]

Fulfilled by the completion of the 2nd level of a single language (either in H.S. or in college). Language study at UNL is available in: ARAB, CHIN, CZEC, FREN, GERM, GREK, JAPN, LATN, SPAN, or SLPA.

1 *Excluded courses:* BIOC 101, BIOS 100, BIOS 180, CHEM 101, MBIO 101, PHYS 201, MATH 100A, MATH 101, MATH 101P, MATH 102, MATH 103, *and MATH subject area credit at the 100 level or below.*

2 ANTH 242L, ASTR 224, BIOS 101L, BIOS 110L, BIOS 111, BIOS 116, BIOS 213L, BIOS 214, CHEM 105L, CHEM 106L, CHEM 109L, CHEM 110L, CHEM 113L, GEOG 155, GEOL 101, GEOL 103, LIFE 120L, LIFE 121L, METR 100, PHYS 141, PHYS 142, PHYS 153, PHYS 221, *or* PHYS 222.

3 *ARAB, CHIN, CZEC, FREN, GERM, GREK, JAPN, LATN, and SPAN courses must be numbered 300 or above. ENGL courses must be* ENGL 170, ENGL 180, *or ENGL 200 level and above. Excluded courses:* CLAS 116, ENGL 254, ENGL 300, ENGL 354, SPAN 300A, SPAN 303, *and* SPAN 304.

4 *Excluded courses:* ANTH 242/ANTH 242L, GEOG 155, GIST 111, GIST 311, POLS 101, POLS 250, PSYC 100, PSYC 273.

5 ARAB 202, CHIN 202, CZEC 202, FREN 202 *or* FREN 210, GERM 202, GREK 301 *and* GREK 302, JAPN 201 *and* JAPN 202, LATN 301 *and* LATN 302, SPAN 202 *or* SPAN 210 *or* SPAN 300A *or* SLPA 202.

[6] ARAB 102, CHIN 102, CZEC 102, FREN 102, GERM 102, GREK 102 *or* GREK 151, JAPN 102, LATN 102, SPAN 102 *or* SPAN 110 *or* SPAN 300A, *or* SLPA 102.

Language Requirement

The University of Nebraska–Lincoln and the College of Arts and Sciences place great value on academic exposure and proficiency in a second language. The University of Nebraska–Lincoln entrance requirement is successful completion of two levels of the same world language, and the College of Arts and Sciences degree requirement (CDR: Language) is proficiency through 4 levels for BA students, or 2 levels for BS students. Levels are defined as years in High School, or semesters in college as documented on an official transcript.

Students who believe they are proficient in a language, but who do not have academic records of that proficiency, should consult with their academic advisor to explore alternative assessments which may include a proficiency examination by a UNL faculty member for languages taught at UNL, or through an approved private service for languages not taught at UNL (expenses for this service would be the student's responsibility.)

Experiential Learning Requirement

All undergraduates in the College of Arts and Sciences must complete an Experiential Learning (EL) designated course. This may include 0-credit courses designed to document co-curricular activities recognized as Experiential Learning. Students should consult their assigned Academic Advisor and Career Coach for assistance identifying experiential learning opportunities relevant to their academic program, interests and goals.

The bachelor of science degree requires students to complete 60 hours in mathematical, physical, and natural sciences from disciplines within the College of Arts and Sciences or required in its majors: ACTS, ASTR, BIOC, BIOS, CHEM, CSCE, GEOL, LIFE, MBIO, METR, MATH, PHYS, STAT or ANTH 242 , ANTH 242L, ANTH 341, ANTH 385, ANTH 386, ANTH 389, ANTH 416, ANTH 422, ANTH 430, ANTH 442, ANTH 443, ANTH 444, ANTH 448, ANTH 473, ANTH 484, ANTH 487D, ENVR 201, GEOG 155, GEOG 217, GEOG 281, GEOG 308, GEOG 317, GEOG 408, GEOG 417, GEOG 418, GEOG 419, GEOG 421, GEOG 422, GEOG 425, GEOG 427, GEOG 432, GEOG 444, GEOG 461, GEOG 467, PHIL 211, POLS 250, PSYC 273, PSYC 368, PSYC 370, PSYC 450, PSYC 451, PSYC 456, PSYC 458,PSYC 460, PSYC 461, PSYC 463, PSYC 464, or PSYC 465.

Excluded courses include: BIOC 101, BIOS 100, BIOS 180, CHEM 101, MATH 100A, MATH 101, MATH 101P, MATH 102, MATH 103, MBIO 101, PHYS 201 as well as any course numbered 395, 495, 399, 399H, 499, or 499H. MATH subject area credit at the 100 level or below is also excluded.

Up to 12 hours of scientific and technical courses offered by other colleges may be accepted toward this requirement with approval of the College of Arts and Sciences. See your assigned academic advisor to start the approval process.

Minimum Hours Required for Graduation

A minimum of 120 semester hours of credit is required for graduation from the College of Arts and Sciences. A cumulative grade point average of at least 2.0 is required.

Grade Rules

Restrictions on C- and D Grades

The College will accept no more than 15 semester hours of C- and D grades from other domestic institutions except for UNO and UNK. All courses taken at UNO and UNK impact the UNL transcript. No transfer of C- and D grades can be applied toward requirements in a major or a minor. No University of Nebraska–Lincoln C- and D grades can be applied toward requirements in a major or a minor. International coursework (including education abroad) with a final grade equivalent to a C- or lower will not be validated by the College of Arts and Sciences departments to be degree applicable.

Pass/No Pass Privilege

University policy for the Pass/No Pass (P/N) privilege:

- Neither the P nor the N grade factor into your GPA.
- 'P' is interpreted to mean a grade of C or above. A grade of C- or lower results in a "N'.
- A change to or from a Pass/No Pass may be made until mid-term (1/2 of the course - see the academic calendar for specific dates per term).
- The Pass/No Pass or grade registration cannot conflict with the policy of the professor, department, college, or University policy governing the grading options.
- Changing to or from the Pass/No Pass grading option requires using MyRED, or processing a Schedule Adjustment Form.
- For undergraduates, the University maximum of 24 'Pass' credit hours and/or college and department limits will apply. These limits do not include courses offered on a 'Pass/No Pass' basis only. Consult your advisor or the Undergraduate Catalog (https://catalog.unl.edu/undergraduate/) for restrictions on the number of 'Pass' hours you can apply toward your degree.
- The 'Pass/No Pass' grading option cannot be used for the removal of 'C-', 'D+', 'D', 'D-', or 'F' grade factors.
  NOTE: See Course Repeats *(*https://registrar.unl.edu/academic-standards/course-repeats/*)*

College of Arts and Sciences policy on the Pass/No Pass (P/N) privilege:

- Pass hours can count toward fulfillment of University ACE requirements and college distribution requirements up to the 24-hour maximum.
- Most arts and sciences majors and minors do not permit any courses graded Pass/No Pass to apply, or limit them to no more than 6 hours. Students should refer to the major section of the catalog for clarification.
- Departments may specify that certain courses of theirs can be taken on a P/N-only or on a graded-only basis.

Grading Appeals

A student who feels that he/she has been unfairly graded must ordinarily take the following sequential steps in a timely manner, usually by initiating the appeal in the semester following the awarding of the grade:

1. Talk with the instructor concerned. Most problems are resolved at this point.
2. Talk to the instructor's department chairperson.
3. Take the case to the Grading Appeal Committee of the department concerned. The Committee should be contacted through the department chairperson.
4. Take the case to the College Grading Appeals Committee by contacting the Dean's Office, 1223 Oldfather Hall.

Course Level Requirements

Courses Numbered at the 300 or 400 Level

Thirty (30) of the 120 semester hours of credit must be in courses numbered at the 300 or 400 level. Of those 30 hours, 15 hours (1/2) must be completed in residence at the University of Nebraska–Lincoln.

Residency Requirement

The term "Residency" refers to courses taken at UNL. Students must complete at least 30 of the 120 total hours for their degree at the University of Nebraska–Lincoln. Students must complete at least 18 hours of their major coursework, and 15 of the 30 hours required at the 300 or 400 level, at UNL.

Catalog to Use

Students must fulfill the requirements stated in the catalog for the academic year in which they are first admitted to and enrolled as a degree-seeking student at the University of Nebraska–Lincoln. In consultation with advisors, a student may choose to follow a subsequent catalog for any academic year in which they are admitted to and enrolled as a degree-seeking student at the University of Nebraska–Lincoln in the College of Arts and Sciences. Students must complete all degree requirements from a single catalog year. Beginning in 1990-1991, the catalog which a student follows for degree requirements may not be more than 10 years old at the time of graduation.

Transfer Students: Students who have transferred from a community college may be eligible to fulfill the requirements as stated in the catalog for an academic year in which they were enrolled at the community college prior to attending the University of Nebraska-Lincoln. This decision should be made in consultation with academic advisors, provided the student a) was enrolled in a community college during the catalog year they are utilizing, b) maintained continuous enrollment at the previous institution for 1 academic year or more, and c) continued enrollment at the University of Nebraska-Lincoln within 1 calendar year from their last term at the previous institution. Students must complete all degree requirements from a single catalog year and within the time frame allowable for that catalog year.

Major Requirements

Core Requirements

METR 100	Weather and Climate	4
METR 153	Introduction to Scientific Programming in Atmospheric Science	3
METR 205	Introduction to Atmospheric Science	4
METR 223	Atmospheric Thermodynamics	4
METR 311	Dynamic Meteorology I	3
METR 312	Dynamic Meteorology II	3
METR 323	Physical Meteorology	4
METR 341	Synoptic Meteorology	4
Select one course (ACE 10):		*4*
METR 442	Advanced Synoptic Meteorology-Climatology	
or METR 470	The Climate System: Analysis and Prediction	
Select one course:		*3*
METR 463	Radar Meteorology	
or METR 464	Satellite Meteorology	
Total Credit Hours		**36**

Specific Major Requirements

Additional Advanced Meteorology Courses		
Select 12 hours of METR courses from the following:		*12*
METR 370 / NRES 370	Applied Climatology	
Any 400 level METR course outside the core requirements.		
Credit Hours Subtotal:		12

Ancillary Requirements

Mathematics and Statistics		
MATH 106	Calculus I	5
MATH 107	Calculus II	4
MATH 208	Calculus III	4
MATH 221	Differential Equations	3
STAT 380	Statistics and Applications	3
Credit Hours Subtotal:		19
Physics		
PHYS 211 & PHYS 221	General Physics I and General Physics Laboratory I	5
PHYS 212	General Physics II	4
Credit Hours Subtotal:		9
Chemistry		
CHEM 109A & CHEM 109L	General Chemistry I and General Chemistry I Laboratory	4
Credit Hours Subtotal:		4
Total Credit Hours		**32**

ADDITIONAL MAJOR REQUIREMENTS

Grade Rules

C- and D Grades

A grade of C or above is required for all courses in the major, including ancillary courses.

Pass/No Pass

No course taken Pass/No Pass will be counted toward the major.

Requirements for Minor Offered by Department

Meteorology Minor

Complete required and additional courses and their prerequisites (MATH 106, MATH 107, and PHYS 211).

Required Courses		
METR 100	Weather and Climate	4
METR 153	Introduction to Scientific Programming in Atmospheric Science	3
METR 205	Introduction to Atmospheric Science	4
METR 223	Atmospheric Thermodynamics	4
Credit Hours Subtotal:		15
Additional Course		
Select one additional course from the following list:		3-4
METR 341	Synoptic Meteorology	

METR 453	GIS in Earth and Atmospheric Sciences	
METR 464	Satellite Meteorology	
Credit Hours Subtotal:		3-4
Total Credit Hours		**18-19**

Grade Rules

C- and D Grades

A grade of C or above is required for all courses in the minor.

Pass/No Pass

No course taken Pass/No Pass will be counted toward the minor.

METR 100 Weather and Climate
Prerequisites: MATH 101 or higher; or a qualifying Math Placement Exam score for MATH 102 or 104 or higher
Description: Physical behavior of the atmosphere; elements of weather and climate and their distribution over the earth. Weather map analysis and forecasting. Atmospheric circulation, precipitation processes, severe weather, air pollution, and the use of weather radar. Concepts of weather forecasting.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded with Option
Prerequisite for: GEOL 372; METR 153; METR 205; METR 270
ACE: ACE 4 Science
Course and Laboratory Fee: $20

METR 101 Pathways to Success in Meteorology-Climatology
Prerequisites: Freshman standing or permission of the instructor.
Description: Exploration of careers in atmospheric science and discussions of atmospheric science subdisciplines and their applications. Departmental and professional resources to help develop pathways to success in atmospheric science.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Pass No Pass
Offered: FALL

METR 140 Severe and Unusual Weather
Prerequisites: MATH 101 or higher; or a qualifying Math Placement Exam score for MATH 102 or 104 or higher.
Notes: Will not count toward the major in METR.
Description: Meteorological basics to help understand ice storms, blizzards, tornadoes, hurricanes, flooding, droughts, and other unusual weather.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: METR 270
ACE: ACE 4 Science

METR 153 Introduction to Scientific Programming in Atmospheric Science
Prerequisites: METR 100
Notes: No prior programming experience is required.
Description: Introduction to problem solving with computers using MATLAB. Topics include language syntax, data types, program organization, problem-solving methods, and algorithm design and verification. Basics of problem solving with computers, and the skills necessary to analyze and visualize geophysical data sets.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 9
Grading Option: Graded
Offered: SPRING
Prerequisite for: METR 205; METR 223; METR 311; METR 323

METR 180 Climate Change, Energy, and the Environment
Description: Concepts and processes of the environment, energy, and climate change and how they are interrelated.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
ACE: ACE 4 Science

METR 205 Introduction to Atmospheric Science
Prerequisites: MATH 106; METR 100; PHYS 211 or 211H, METR 153
Description: Conceptual foundations for synoptic and dynamic meteorology. Meteorological data analysis, the dynamics of atmospheric motions, and atmospheric thermodynamics.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded with Option
Offered: FALL
Prerequisite for: METR 223; METR 311; METR 323
Course and Laboratory Fee: $20

METR 223 Atmospheric Thermodynamics
Prerequisites: METR 153; METR 205; MATH 107 or parallel.
Description: Basic thermodynamic concepts relevant to atmospheric processes, atmospheric stability, and cloud and precipitation micro-physics.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded with Option
Prerequisite for: METR 341

METR 270 Global Warming: Science, Impacts, Solutions
Prerequisites: METR 100 or METR 140 or METR 180
Description: Develop an awareness of the human dimensions of climate change by investigating its impacts, adaptations, and solutions at local, regional, and global scales. Examine how vulnerability to climate change is shaped by socio-economic, cultural, and geographical factors.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Offered: FALL
ACE: ACE 9 Global/Diversity

METR 291 Special Topics in Meteorology-Climatology
Description: Topics vary.
Credit Hours: 1-6
Min credits per semester: 1
Max credits per semester: 6
Max credits per degree: 6
Grading Option: Graded with Option

METR 296 Independent Study in Meteorology-Climatology
Prerequisites: Permission.
Description: Independent reading or research under direction of a faculty member.
Credit Hours: 1-3
Min credits per semester: 1
Max credits per semester: 3
Max credits per degree: 6
Grading Option: Graded with Option

METR 311 Dynamic Meteorology I
Prerequisites: METR 153; MATH 208/208H; METR 205; PHYS 211/211H
Description: Equations of thermodynamics, momentum, and continuity are derived and applied to atmospheric motion. Energy conservation, flows, and conversions.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: METR 312

METR 312 Dynamic Meteorology II
Prerequisites: METR 311; MATH 221/821.
Description: Applications of the principles of dynamic meteorology to the problems of forecasting and meteorological problems.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL/SPR

METR 323 Physical Meteorology
Prerequisites: METR 153; METR 205; PHYS 212/212H
Description: Physical principles that provide the foundation for meteorology. Absorption, scattering, and transmission of radiation in the atmosphere, atmospheric optics, atmospheric electricity, and lightning.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded with Option
Course and Laboratory Fee: $20

METR 341 Synoptic Meteorology
Prerequisites: METR 223
Description: Dynamic and thermodynamic concepts and principles applied to synoptic-scale weather forecasting. Dynamics, energetics, structure, evolution, and motion of extra-tropical cyclones. Meteorological communications, interpretation and analysis of weather maps, and thermodynamic diagrams.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded with Option
Course and Laboratory Fee: $40

METR 370 Applied Climatology
Crosslisted with: NRES 370
Prerequisites: Junior or Senior Standing
Description: Processes that give rise to spatial and temporal differences in climate. Various interrelationships between humans and climate. Influence of climate on building styles, the economy, water resources, human health, and society. Humans' inadvertent and purposeful modification of the atmosphere.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL

METR 408 Microclimate: The Biological Environment
Crosslisted with: PLAS 408, GEOG 408, NRES 408, AGRO 808, GEOG 808, HORT 808, METR 808, NRES 808
Prerequisites: Junior standing, MATH 106 or equivalent, 5 hrs physics, major in any of the physical or biological sciences or engineering.
Description: Physical factors that create the biological environment. Radiation and energy balances of earth's surfaces, terrestrial and marine. Temperature, humidity, and wind regimes near the surface. Control of the physical environment through irrigation, windbreaks, frost protection, manipulation of light, and radiation. Applications to air pollution research. Instruments for measuring environmental conditions and remote sensing of the environment.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: BSEN 954, NRES 954

METR 415 General Circulation of the Atmosphere
Crosslisted with: METR 815
Prerequisites: Junior standing; METR 475/875; PHYS 211/211H; and PHYS 221.
Description: Development of the atmospheric circulation regimes, from planetary scale (e.g., the planetary waves) to synoptic scale (e.g., the cyclones and anticyclones) and mesoscale, their seasonal variations, and their roles in horizontal vertical energy and water transport and budgets in the Earth system.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

METR 421 Cloud Physics
Crosslisted with: METR 821
Prerequisites: METR 223 and METR 323 or equivalent
Description: Buoyancy and parcel mixing, cloud physics instrumentation, the role of aerosols in precipitation processes, growth of liquid cloud droplets/raindrops/ice crystals, processes associated with falling precipitation particles, drop size distributions and their moments, applications to convection, and parameterizations of cloud microphysical processes for numerical modeling applications.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

METR 433 Boundary-layer Meteorology
Crosslisted with: METR 833
Prerequisites: METR 223 and MATH 208/208H
Description: Basic concepts of atmospheric turbulence and fundamental dynamics, thermodynamics, and structure of the atmospheric boundary layer are discussed. Atmospheric boundary layer parameterizations used in modern weather and climate models are presented.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: METR 933

METR 442 Advanced Synoptic Meteorology-Climatology
Crosslisted with: METR 842
Prerequisites: METR 341.
Description: Analysis and forecasting of subsynoptic-scale weather systems. Convection, thunderstorm models, severe local storm forecasting techniques, mesoscale convective complexes, vertical cross-sections, isentropic analysis, and weather radar.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded with Option
Prerequisite for: METR 944
ACE: ACE 10 Integrated Product
Course and Laboratory Fee: $40
Experiential Learning: Research

METR 443 Severe Storms Meteorology-Climatology
Crosslisted with: METR 843
Prerequisites: METR 311, METR 341 or parallel
Description: Dynamics of various types of severe weather (blizzards, flash floods, lightning, thunderstorms and winter and summer tornado outbreaks). Interpretation of the numerical and statistical models utilized to forecast these phenomena. Synoptic case studies of severe weather occurrences. Recent research on severe weather.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

METR 444 Mesoscale Meteorology
Crosslisted with: METR 844
Prerequisites: METR 311
Description: Dynamics and conceptual models of mesoscale meteorological phenomena and processes.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

METR 450 Climate and Society
Crosslisted with: PLAS 450, GEOG 450, NRES 452, AGRO 850, GEOG 850, METR 850, NRES 852
Prerequisites: Junior standing or above.
Notes: Offered spring semester of even-numbered calendar years.
Description: Impact of climate and extreme climatic events on society and societal responses to those events. Global in scope and interdisciplinary.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: SPRING

METR 453 GIS in Earth and Atmospheric Sciences
Crosslisted with: GEOL 453, GEOL 853, METR 853
Prerequisites: Junior or above standing; and one of the following: GEOL 100 or 101, or METR 100
Description: Basic concepts of GIS, hands-on experience with various case studies from geology, meteorology, climatology and environmental applications.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

METR 463 Radar Meteorology
Crosslisted with: METR 863
Prerequisites: METR 323.
Description: The fundamental principles of weather radars and the basic application of these principles.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: SPRING
Course and Laboratory Fee: $150
Experiential Learning: Research

METR 464 Satellite Meteorology
Crosslisted with: METR 864
Prerequisites: METR 223
Description: Concepts and principles related to meteorological observations from satellites. Applications for weather analysis and forecasting.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Course and Laboratory Fee: $20

METR 469 Bio-Atmospheric Instrumentation
Crosslisted with: GEOG 469, PLAS 407, AGST 469, NRES 469, AGRO 869, GEOG 869, HORT 807, METR 869, AGST 869, NRES 869
Prerequisites: Junior standing; MATH 106; 4 hrs physics; physical or biological science major.
Description: Discussion and practical application of principles and practices of measuring meteorological and related variables near the earth's surface including temperature, humidity, precipitation, pressure, radiation and wind. Performance characteristics of sensors and modern data collection methods are discussed and evaluated.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

METR 470 The Climate System: Analysis and Prediction
Crosslisted with: METR 870
Prerequisites: Senior standing; major or minor in meteorology.
Description: Maintenance of the climate system and climate change over time. Global budgets of energy, water, and momentum and their balance. Development of simple, physically-based models of climate and of climate change.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
ACE: ACE 10 Integrated Product
Experiential Learning: Research

METR 471 Tropical Meteorology
Crosslisted with: METR 871
Prerequisites: METR 223 and METR 311
Description: Atmospheric phenomena unique to the tropics, and their connection to the global circulation.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

METR 478 Regional Climatology
Crosslisted with: METR 878, NRES 478, NRES 878
Prerequisites: NRES/METR 370.
Description: Regional differentiation of the climates of the earth on both a descriptive and dynamic basis. The chief systems of climatic classification.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

METR 479 Hydroclimatology
Crosslisted with: NRES 479, BSEN 479, NRES 879, METR 879, BSEN 879
Prerequisites: NRES 208 or METR 100 or METR/NRES 370.
Notes: Offered spring semester of even-numbered calendar years.
Description: Interaction between earth's climate and the hydrologic cycle. Energy and water fluxes at the land-atmosphere interface. Atmospheric moisture transport, precipitation, evaporation, snowmelt, and runoff. Impacts of climate variability and change on the hydrologic cycle.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

METR 483 Global Climate Change
Crosslisted with: METR 883, NRES 467, NRES 867
Prerequisites: Junior standing; and METR 475/875.
Notes: Offered fall semester of even-numbered calendar years.
Description: Elements of climate systems, El Nino/LaNina cycle and monsoons, natural variability of climate on interannual and interdecadal scales. Paleoclimate, and future climate, developed climate change scenarios and climate change impacts on natural resources and the environment.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

METR 487 Earth's Climate: Past, Present, Future
Crosslisted with: METR 887
Prerequisites: 6 hrs METR or 6 hrs GEOL.
Description: How the Earth's climate has varied and the forcing mechanisms related to those changes. Themes that reappear through Earth's climate history and into the future; causes of climate change; the natural response times of the multiple components; and the role of greenhouse gases within the climate system at differing time scales.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

METR 491 Special Topics in Meteorology-Climatology
Crosslisted with: METR 891
Description: Topics vary.
Credit Hours: 1-6
Min credits per semester: 1
Max credits per semester: 6
Max credits per degree: 8
Grading Option: Graded with Option

METR 495 Internship in Meteorology-Climatology
Crosslisted with: METR 895
Prerequisites: Permission.
Description: Application of meteorology-climatology learning with on-the-job training.
Credit Hours: 1-6
Min credits per semester: 1
Max credits per semester: 6
Max credits per degree: 6
Grading Option: Pass No Pass
Experiential Learning: Internship/Co-op

METR 496 Independent Study in Meteorology-Climatology
Prerequisites: Permission.
Description: Independent reading or research under direction of a faculty member.
Credit Hours: 1-3
Min credits per semester: 1
Max credits per semester: 3
Max credits per degree: 6
Grading Option: Graded with Option

METR 499 Undergraduate Thesis
Prerequisites: Permission.
Description: Independent research leading to a thesis.
Credit Hours: 1-3
Min credits per semester: 1
Max credits per semester: 3
Max credits per degree: 6
Grading Option: Graded with Option

METR 499H Honors Undergraduate Thesis
Prerequisites: Permission. Credit toward the degree cannot be earned in both METR 499 and METR 499H.
Description: Independent research leading to a thesis.
Credit Hours: 1-3
Min credits per semester: 1
Max credits per semester: 3
Max credits per degree: 6
Grading Option: Graded with Option

Career Information

The following represents a sample of the internships, jobs and graduate school programs that current students and recent graduates have reported.

Transferable Skills

- Analyze and explain data
- Use quantitative analysis techniques
- Use qualitative analysis techniques
- Define problems and identifying causes
- Apply mathematical and scientific skills to solve real-world problems
- Make predictions using mathematical, statistical, and scientific modeling methods
- Make decisions carefully, using appropriate theoretical frameworks
- Simplify complex information and present it to others
- Communicate results of scientific experiments to scientific and non-scientific audiences
- Read, understand, and critically review scientific information
- Support and communicate claims using clear evidence
- Listen actively and facilitate individual and group communication
- Collaborate with a team to develop solutions
- Communicate clearly using different forms of writing to and for a variety of different audiences
- Coordinate people, activities, and event details

Jobs of Recent Graduates

- Environment Scientist II, North Dakota Department of Environment Quality – Bismarck, ND
- Palace Acquire Program, U.S. Air Force 557 Weather Wing – Offutt AFB, NE
- Payroll Specialist, Omaha National – Omaha, NE
- Systems Engineer, Northrop Grumman – Bellevue, NE
- Systems Engineer, Raytheon – Omaha, NE
- Meteorologist, Nebraska Department of Roads – Lincoln, NE
- Meteorologist, Weather or Not – Shawnee, KS
- Coding Specialist, National Research Corporation – Lincoln, NE
- Meteorologist, National Weather Service – Silver Spring, MD
- Underwriting Assistant, National Indemnity – Omaha, NE

Internships

- Weather Intern, Channel 8 - Lincoln NE
- Research Technician, Planetary Data, Inc. - Prague NE
- Research Assistant, UNL Earth and Atmospheric Sciences - Lincoln NE
- Architectural Engineering Intern, Ezenics, Inc. - Omaha NE
- Intern, MMC Contractors - Omaha NE

Graduate & Professional Schools

- Master's Degree, Environment and Society, Utah State University – Salt Lake City, UT
- Master's Degree, Geospatial Analysis, East Tennessee State University – Johnson City, TN
- Master's Degree, Meteorology, University of Wisconsin–Madison – Madison, WI
- Master's Degree, Meteorology, University of Oklahoma – Norman, OK
- Master's Degree, Meteorology, Penn State University – State College, PA
- Master's Degree, Meteorology, University of Nebraska–Lincoln – Lincoln, NE
- Master's Degree, Earth & Atmospheric Science – Meteorology-Climatology, University of Nebraska-Lincoln – Lincoln, NE
- Ph.D., Earth & Atmospheric Science – Meteorology-Climatology, University of Nebraska-Lincoln – Lincoln NE