

# Doctor of Philosophy in Atmospheric Science

Atmospheric Science is the study of weather and climate. The atmosphere is a key component of the environment and affects many human activities ranging from daily weather prediction to the understanding of climate and human health. Our program provides graduate students with the advanced training to address a host of meteorological and climate-related issues facing humans today.

By the end of the program, Ph.D. students will be able to perform independent, creative research within their chosen sub-discipline. In addition to becoming an expert in their sub-discipline, students will obtain a solid background in the fundamentals of atmospheric physics and applied mathematics. The student's research will often require knowledge of subject fields outside of atmospheric science that is related to their dissertation, which could include oceanography, physics, geophysics, mathematics, statistics, engineering, or similar fields.

Early in their program, students will take fundamental courses in atmospheric science including atmospheric dynamics, numerical modeling, and advanced statistics. A majority of the student's time will be devoted to their research project.

For more information, visit our website (<http://geog.ku.edu/>).

## Admission to Graduate Studies Admission Requirements

- All applicants must meet the requirements outlined in the Admission to Graduate Study (<https://policy.ku.edu/graduate-studies/admission-to-graduate-study/>) policy.
- Bachelor's degree: A copy of official transcripts showing proof of a bachelor's degree (and any post-bachelor's coursework or degrees) from a regionally accredited institution, or a foreign university with equivalent bachelor's degree requirements is required.
- English proficiency: Proof of English proficiency (<https://gradapply.ku.edu/english-requirements/>) for non-native or non-native-like English speakers is required. There are two bands of English proficiency, including Admission and Full proficiency. For applicants to online programs, Full proficiency is required.

Entering students are expected to have an M.S. degree in atmospheric science or in another physical science, mathematics, or engineering. Entering students will be expected to have studied mathematics, including vector calculus and ordinary differential equations. They should also have taken the equivalent of at least 2 semesters of calculus-based physics and one of chemistry.

The following items must be received to complete the application file:

1. **A completed Graduate Application Form found on the Graduate Admissions website.**
2. **A current resume/CV**
3. **A Statement of Interest and Goals.** This is included in the on-line application form. The Graduate Studies Committee places considerable importance on the thoughtfulness of your remarks – in particular, we are interested in learning about (1) your specific

interests within Atmospheric Science and why they are important and interesting to you, (2) what you envision as your educational and career objectives and how a degree from KU helps to meet those objectives, and (3) which of our faculty members you think would be an appropriate graduate advisor and mentor.

4. **A scanned copy of an official transcript** can be uploaded at the time of application. Official, degree conferred transcripts will be required prior to the second semester of study. NOTE: Documents uploaded with your application are not considered official. KU does not consider transcripts that come from applicants or that have been in the applicant's possession as official.
5. **Three confidential letters of recommendation** sent by referees who are familiar with your academic and/or professional activities and who can address your likelihood of success in graduate school. If possible, we prefer letters from professors, but applicants returning to school after a lengthy absence may substitute letters from supervisors. Note that it is the responsibility of the applicant to request and to confirm that the required letters have been sent by the deadline. When using the on-line reference form to list references, you must include valid e-mail addresses. Once you have completed and submitted your application, your references will be contacted directly via email with directions for submitting their letters of recommendation.

\*\*Graduate Record Examination (GRE) scores are not required for the application. Applicants may choose to submit GRE scores if they feel it will help inform the department of their academic abilities. However, choosing not to submit scores will not affect your chances of admission.\*\*

Submit your graduate application online (<https://gradapply.ku.edu/>). For questions, contact:

### The Graduate Program Coordinator

#### Preparatory Training

Entering students are expected to have studied mathematics, including vector calculus and ordinary differential equations. They should also have taken the equivalent of at least 2 semesters of calculus-based physics and one of chemistry. Students who have not completed coursework in these areas may be admitted to the program, but may be required to successfully complete additional coursework to fulfill the preparatory training expectations after admission. These additional courses do not count towards the fulfillment of required hours for the Ph.D. in Atmospheric Science.

#### Required Course Work

Upon a student's admission to the department, the Graduate Studies Committee (GSC) will appoint an advisor. Early in the first semester (preferably in the first week of classes), the student should meet with this advisor to outline a tentative program of coursework for the degree. Such programs should be solidified by the time of enrollment for the second semester. The student and advisor then continue to discuss and update programs each semester.

Code	Title	Hours
<b>Core Courses</b>		
ATMO 710	Atmospheric Dynamics	3
ATMO 720	Atmospheric Modeling	3
GEOG 716	Advanced Geostatistics	3
Attend Department's New Graduate Student Orientation (non-credit)		

GEOG 980	Seminar in Geography: _____ (Colloquium for 1 credit hour during each of the first 2 semesters of residence at KU.)	2
	500 level and above courses in mathematics, engineering, or other research skill courses chosen in consultation with student's committee	6
<b>Electives</b>		<b>24</b>
Electives are selected in consultation with the faculty advisor and are tailored to fit the needs of the individual student. Total required elective hours may vary based on the student's research interest and needs, but will not exceed 24. Courses outside of this list may be approved by the student's advisor.		
ATMO 731	Advanced Topics in Atmospheric Science: _____	
MATH 647	Applied Partial Differential Equations	
MATH 781	Numerical Analysis I	
GEOG 558	Spatial Data Analysis	
BIOL 513	Virology Laboratory	
BIOL 594	Forest Ecosystems	
BIOL 841	Biometry I	
CE 730		
CE 751	Physical Hydrology	
<b>Total Hours</b>		<b>41</b>

## Research Skills and Responsible Scholarship Requirement

The University requires that every doctoral student receive training in responsible scholarship pertinent to the field of research and obtain research skills pertinent to the doctoral level of research in their field(s). These requirements must be completed by the end of the semester that the student takes the oral comprehensive exam. For students in the Atmospheric Science Ph.D. program, this will be met by 6 credits at the 500 level or above in mathematics and/or engineering. Alternatively, 6 credits at the 500 level or above in a related discipline which are approved by the student's advisor may also be used for this requirement. The courses for the Research Skills requirement must be taken during the PhD program. Students must participate in the department's 8 hour non-credit hour Responsible Scholarship Seminar to meet the Responsible Scholarship requirement.

## Dissertation Proposal/Oral Comprehensive Exam

All candidates must pass a comprehensive written examination. It consists of two parts: written questions submitted by the committee members and then oral examination. For the written questions, they may be open-book or closed at the discretion of the individual committee member submitting the questions. A majority of the members must approve their individual written portions of the examination in order for the oral portion to take place. In the oral section, students often are asked to elaborate and comment on their written answers. The focus is on the proposal, however, with probes into its scope, justification, and methodology being common.

## Post-Oral Comprehensive Exam Requirements

Upon passing the comprehensive examination, the student becomes a candidate for the Ph.D. degree and is approved to proceed with their dissertation research and project. At least once each year after passing the comprehensive examination, the student must schedule a

meeting with their dissertation committee to discuss progress towards the completion of the dissertation and any other concerns.

Starting the semester following successful completion of the oral comprehensive exam, students must enroll in accordance with the Office of Graduate Studies' Doctoral Candidacy Policy (<https://policy.ku.edu/graduate-studies/doctoral-candidacy/>). This enrollment includes, but is not limited to, at least 1 dissertation hour every semester until graduation. See the Doctoral Candidacy policy for more information about this University level requirement.

## Final Defense

The student must complete an oral defense of their dissertation. The committee will be made up of at least 4 members in compliance with the Doctoral Student Oral Exam Committee Composition policy (<https://policy.ku.edu/graduate-studies/doctoral-student-oral-exam-committee-composition/>). A majority of the committee members must approve the defense outcome. The possible outcomes for the defense are "honors", "satisfactory", or "unsatisfactory".

Students that fail the defense on their first attempt may repeat the defense at the recommendation of the degree program one more time. Such repetition can be undertaken no sooner than 90 days after the last defense.

While completing degree requirements, graduate students are expected to understand and follow Office of Graduate Studies policies (<https://ogs.ku.edu/policies/>) relevant to their student status and academic standing.

At the completion of this program, students will be able to:

- Demonstrate mastery of the principles governing the atmosphere and apply diagnostic, prognostic, and technological tools to evaluate atmospheric processes across spatial and temporal scales and within most subdisciplines of Atmospheric Science.
- Work with data by applying mathematical and statistical techniques through scientific programming languages or meteorological software packages.
- Effectively communicate scientific information both broadly related to their discipline and also specific to their thesis/ dissertation in both oral and also written form at an appropriate level for their audience (e.g., for the general public and at professional conferences).
- Create, synthesize, or apply knowledge within the atmospheric sciences or between the atmospheric sciences and other disciplines throughout the degree program culminating in novel scientific results.