

Department of Atmospheric Science Student Learning Outcomes

The Department of Atmospheric Science seeks to prepare qualified individuals for careers in research, teaching and applied science through the completion of an advanced degree (MS or PhD) in atmospheric science. While there are elements of the MS and PhD programs which are common, there is no common content or skill set to be achieved for all students. Programs are adapted to the specific faculty and student interests and needs. Thus, the following descriptions of fundamental outcomes may not be comprehensive.

MS degree:

The MS degree is intended to develop scientific capabilities through graduate courses and research. The research is to be demonstrated through completing a research thesis that is expected to be accomplished in approximately two years. The results of such research ideally but necessarily would contribute to the science through peer-reviewed publication. The MS program prepares students for supporting scientific research in governmental, academic, or private laboratories, teaching at the secondary or community college level, or private consulting. The degree may lead directly to employment or may be a step toward a PhD. MS students will have demonstrated:

- a) a broad working knowledge of the atmospheric sciences encompassed by the core curriculum.
- b) analytical and mathematical skills necessary to develop insight into physical processes in the atmosphere
- c) familiarity with the literature in the area of the research thesis.
- d) ability to analyze and synthesize data (observations and/or modeling) necessary in the thesis research.
- e) ability to carry out directed research.
- f) ability to communicate research results in the form of written reports, visual displays, and scientific presentations.

PhD Degree

The PhD degree is awarded upon attainment of independent scholarship in atmospheric science. This accomplishment is demonstrated by the ability to conduct scientific discourse across a wide range of disciplines within the science, and the ability to conduct original research leading to unique contributions in an area of specialization. The PhD program consists of course work, participation in the intellectual life of the department and the university, and development of skills required to pursue independent research. Admission to the PhD program is granted to students who show high promise of sustained effort and dedication to the pursuit of knowledge in atmospheric and related sciences. The PhD program prepares students for carrying out independent research in governmental, academic, or private laboratories, and for teaching at the community college, 4-year college, or university level. PhD students will have demonstrated:

- a) skills and abilities sufficient to satisfy the MS degree requirements.
- b) deep understanding of the literature in the dissertation area.
- c) ability to independently identify relevant scientific problems in the dissertation specialty area.
- d) ability to design methods for observation and experimentation, and evaluate the results of such research.
- e) ability to communicate research results in peer-reviewed journals, and present effective seminars to both on- and off-campus colleagues.
- f) ability to plan course syllabi, and present well-organized and effective lectures for upper division and graduate level education.

Tools for measuring outcomes

- 1) Performance in class, grades and instructors assessments.
- 2) Performance in introductory, or MS, research project, including ability to follow minimal guidance, work independently, analyze data, think critically, and present effectively.
- 3) Performance on final MS exam.
- 4) Positions obtained following graduation.

Additional tools for PhD students:

- 5) Performance on qualifying assessment including ability to think both deeply and broadly.
- 6) Presentation of departmental colloquia.
- 7) Performance in developing a research plan for final dissertation project
- 8) Performance in presenting and defending the research plan as part of the preliminary examination
- 9) Execution and presentation of final research project
- 10) Performance on final exam.
- 11) Positions obtained following graduation.