

Revising the AMS Bachelor's Degree Statement to Best Prepare Undergraduates for the Rapidly Evolving Workforce

ON 17 NOVEMBER 2023, the AMS Council approved posting the updated version of the AMS “Bachelor’s Degree in Atmospheric Science” statement. The goal of this statement is to provide meteorology and atmospheric science undergraduate degree programs across the United States guidance to best prepare students at all institutions to have the skills needed for success within the private, public, and academic sectors. A team of 10 AMS community members, including several members of the Board on Higher Education (BHE), along with former AMS Education and Engagement Commission Commissioner Kevin Goebbert and current Commissioner Elisabeth Cohen, worked together in updating this statement.

Three AMS community feedback opportunities were provided. The first opportunity occurred during the early stages of revision (summer 2022) by sending out an informal survey to collect thoughts about what improvements and changes were needed. The second opportunity occurred during a Town Hall meeting at the 103rd AMS Annual Meeting on 12 January 2023, where audience participants were provided access to copies of the draft statement and could ask questions both in person and virtually. The third opportunity occurred after completing a polished draft of the statement during a 30-day AMS public commentary period in July 2023. The AMS Council also reviewed the statement both before and after the public commentary period, and input was received in partnership with other AMS initiatives that were also in

progress (e.g., Mind the Gap Committee on academic/private-sector topics). This statement was revised by several members of the AMS community, and the revision team did their best to consider all feedback.

The most significant challenge in updating the statement is that meteorology and atmospheric sciences programs across the United States differ significantly with respect to 1) the number of students enrolled within the degree program; 2) the number of faculty instructors, advisors, and administrative staff support within the program; and 3) the resources available for classroom instruction, materials, and out-of-class experiences (e.g., undergraduate research and internship opportunities). While the updated statement cannot solve all the above challenges, the hope is that the general guidelines advised continue to provide a strong foundational structure for best preparing students for any professional or graduate school opportunities after completion of their degree program.

The following items outline the most significant changes to this document since the 2017 update cycle; it is important to note that this statement does not require any department to follow any guideline discussed, as AMS does not enforce accreditation or degree requirement standards.

- **Embedded links**—To provide readers more detailed information about a variety of topics, including equity and inclusion; advising; undergraduate instructional strategies (e.g., high-impact practices); and even access to key

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documentation surrounding the GS-1340 federal civil service requirements, AMS certifications, and the AMS code of conduct, the statement committee has embedded several website links throughout. This prevents the statement itself from exceeding the typical length of AMS statements while simultaneously providing detailed information about various topics to those interested.

- **Best practices for private-sector careers**—Given the increasing percentage of undergraduate students pursuing private-sector positions over government and academic opportunities, the statement now includes an appendix focused on preparing students for the private sector as well as guidance throughout the statement itself.
- **Two-year college student and advisor guidance**—Another new appendix has been added to this statement focused on best practices for helping students at two-year colleges prepare to transfer to four-year colleges and universities to complete a bachelor’s degree in the atmospheric sciences; the statement also provides guidance for advisors at two-year programs to help prepare students for successful transfer to a four-year program.
- **Updated program-level learning outcomes**—The program-level learning outcomes in section 3 have been updated to highlight the skill sets that students need to be best prepared for all career and graduate school opportunities upon graduation from the bachelor’s degree program. Along with sufficient knowledge of atmospheric science topics, programs should help students develop strong computer programming and communication skills, familiarity with a variety of observational and forecast datasets, strong ethical values, and

ability to apply their learned material in an interdisciplinary manner.

- **Undergraduate degree courses**—Section 4 lists the suggested coursework for an undergraduate atmospheric sciences degree. One challenging consideration was whether to recommend a differential equations math course; while the GS-1340 federal requirements require this for employment, there are many AMS community members who think that this course is not necessary for success within an undergraduate degree program (nor is it necessary to be successful within several private-sector and even academic endeavors postgraduation). For the updated statement, the committee opted to exclude listing this course under the list of math courses to be inclusive to varying department opinion on the matter, noting that any student interested in federal employment still needs this course to be GS-1340 compliant.
- **Appendices on AMS certifications and government employment requirements**—Separate appendices exist for readers interested in learning more about the various AMS certification programs, including the new Certified Digital Meteorologist (CDM) program and various federal government employment requirements. The latter includes both GS-1340 as well as several other “series” requirements.

Along with the above key updates, other minor revisions were included throughout the statement to accommodate for increased online teaching and learning (especially after the Covid-19 pandemic) and updated information for careers in the military as well as nonuniversity education (e.g., K–12 instruction).

While the previous five-year period was associated with dramatic changes in educational instruction (e.g., online and hybrid

learning following the Covid-19 pandemic), it is likely that the next five years will also bring substantial change. For example, with the rise in AI technology and writing software, instructors are still grappling with how to best address this technology within the classroom. As another example, weather forecast models may become more dependent on AI and machine learning, and it is important for the community to think about how to best prepare students to understand such technologies and adjust to these changes within their undergraduate programs. Lastly, addressing challenges related to

equity and inclusion will continue as the fields of meteorology and atmospheric science move toward a more equitable and inclusive community. While this statement addressed some of the above, it likely covered only some of these topics, and this will be of interest for the next statement committee to address along with other unforeseen challenges in the future. •

→ Read the "Bachelor's Degree in Atmospheric Science" statement at <https://www.ametsoc.org/index.cfm/ams/about-ams/ams-statements/statements-of-the-ams-in-force/bachelors-degree-in-atmospheric-science/>.

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