

THE UNIVERSITY OF NORTH CAROLINA ASHEVILLE
FACULTY SENATE

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Statement of Faculty Senate Action:

Petition for Exemption to SD2015F
Department of Atmospheric Sciences (ATMS)
September 18, 2019

1. Executive Summary

The Department of Atmospheric Sciences (ATMS) provides a comprehensive and rigorous course of study that prepares students for careers in weather forecasting, climatology, and broadcasting. The curriculum is carefully designed to not only satisfy federal service requirements but to also provide students with interdisciplinary skills for their future careers. Peer institution comparisons and graduation data clearly support the contention that our program requirements are effective and streamlined.

2. ATMS Curriculum

The vast majority of meteorology/atmospheric science programs in the United States, including ATMS, are designed to satisfy the U.S. Office of Personnel Management qualifications for federal employment as a meteorologist. These are commonly referred to as the GS-1340 requirements. Students who do not fulfill the required coursework are ineligible for employment with the National Weather Service (NWS) and related branches of the Department of Commerce. *Providing a curriculum that leaves students without the minimum number of hours to work for the biggest employer of meteorologists in the nation would be a fatal development for our department.*

The GS-1340 requirements are published online (<https://www.opm.gov/policy-data-oversight/classification-qualifications/general-schedule-qualification-standards/1300/meteorology-series-1340/>). Table 1 summarizes the requirements and lists the ATMS courses that are delivered to satisfy each.

GS-1340 Requirement	Courses That Satisfy Requirement
6 semester hours of atmospheric dynamics	ATMS 305, ATMS 310
6 semester hours of analysis and prediction	ATMS 410, ATMS 411
3 semester hours of physical meteorology	ATMS 455
2 semester hours of remote sensing/instrumentation	ATMS 320
6 semester hours of physics	PHYS 221, PHYS 222
3 semester hours of differential equations	MATH 394
9 additional semester hours of appropriate courses	ATMS 405, CHEM 132, ATMS 355, ATMS 223, ATMS 230, CSCI 183

Table 1. Mapping of ATMS courses to GS-1340 requirements.

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The direct mapping of courses totals 35 credit hours. There are several other courses that must be completed to either satisfy prerequisites for the courses listed above or acquire critical oral and written skills:

- ATMS 103/111/113 (Introduction to Meteorology, 3-4 credit hours) – Required for all ATMS classes
- ATMS 203 (Foundations of ATMS I, 2 credit hours) – Proposed – replaces ATMS 205 and ATMS 241
- ATMS 204 (Foundations of ATMS II, 2 credit hours) – Proposed – replaces ATMS 251 and ATMS 261
- MATH 191/192/291 (Calculus I, II, III, 12 credit hours) – Required for MATH 394
- ATMS 464 (Scientific Writing, 3 credit hours) – Upper level science writing and research course

The core ATMS curriculum totals a minimum of 57 credit hours. The remaining credit hours depend on the major concentration selected by the student.

a. Weather Forecasting Concentration (69 total credit hours)

Students in the weather forecasting concentration are preparing for careers with the NWS or the private forecasting enterprise. They are required to take the following additional courses:

- ATMS 350 (Weather Forecasting, 3 credit hours)
- Two electives chosen from ATMS 223 (Physical Climatology), ATMS 355 (Physical Oceanography), ATMS 405 (Meteorological Statistics), and ENVR 338 (Principles of Hydrology) – 6 credit hours
- One additional 300-400 level ATMS elective (3 credit hours)

The two electives chosen from the list of four courses ensure that students fulfill the topical requirements of the GS-1340 policy. The third elective at the 300-400 level is open ended and intended to give majors some flexibility in choosing a special topical course in meteorology or climatology, such as ATMS 420 (Applied Climatology) or ATMS 345 (Tropical Meteorology).

b. Climatology Concentration (69 total credit hours)

Students in the climatology concentration are preparing for careers in the climate sector. This sub-discipline of atmospheric science has been experiencing tremendous growth over the past two decades as climate change has come to the forefront in many areas of government and the private sector. Historically, many ATMS students in this concentration have continued their education in graduate school as well.

Courses required for the climatology concentration are:

- ATMS 223 (Physical Climatology, 3 credit hours)
- ATMS 405 (Meteorological Statistics, 3 credit hours)
- ATMS 420 (Applied Climatology, 3 credit hours)
- One additional 300-400 level ATMS elective (3 credit hours)

The additional 300-400 elective is intended to give majors some flexibility in choosing a related climatology or atmospheric science course not part of the required curriculum, such as ATMS 315 (Mesoscale Meteorology), ATMS 345 (Tropical Meteorology), or ATMS 350 (Weather Forecasting).

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c. Broadcast Meteorology Concentration (71 total credit hours)

Prior to the creation of this concentration several years ago, ATMS had produced a number of students who have gone on to successful careers in the weather broadcast field. ATMS formally created this area of study to provide a more structured preparation for students preparing for careers in broadcast meteorology. This is the most interdisciplinary concentration in ATMS.

Courses required for the broadcast meteorology concentration are:

- DRAM 213 (Public Speaking, 3 credit hours)
- MCOM 201 (Basic Journalism, 4 credit hours)
- VMP 205 (Basic Video Production, 4 credit hours)
- ATMS 350 (Weather Forecasting, 3 credit hours)

3. Selection of Peer Institutions

A list of undergraduate-only institutions that offer a meteorology or related field degree was provided to Prof. Cameron through email. Prof. Cameron provided a list of 23 institutions for us to consider as UNC Asheville peer comparisons. There are no schools that appear on both lists. Prof. Cameron suggested that we provide a comparison of six institutions from our list, four or more that meet NWS requirements for employment and two that do not meet those requirements. She also suggested that we include a comparison of the liberal arts schools.

The ATMS faculty selected the following institutions for comparison:

Valparaiso University*
St. Cloud State University
SUNY-Oswego
Millersville University
Lyndon State College*
Northland College*
Metropolitan State University of Denver (MSUD)

Starred (*) institutions are traditional liberal arts schools. Northland College and MSUD offer at least one program that does not satisfy NWS employment criteria. All institutions are primarily undergraduate. Although we believe this list provides a suitable comparison to our curriculum, we note that the comparative results would likely be very similar for any other list of schools with meteorology programs, since most are designed to fulfill GS-1340 requirements.

4. Peer Institution Comparisons

a. Credit Hours Required For Degree

Table 2 shows a comparison of the number of credit hours required to earn a degree in meteorology at each institution for each concentration or course of study. Data for each institution were found on their website and has not been verified. The web URLs for each program are listed in Appendix A. The number of credit hours is broken down into core departmental courses and required classes outside of the major department. Whenever a range of credit hours is required, the minimum number is listed.

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Figure 1 shows the same data in Table 1. The required credit hours for an atmospheric science degree at UNC Asheville are comparable (Valparaiso, Northland College) or less than the peer institutions. The mean number of credit hours required from peer institutions is 74.7, exceeding any one of the ATMS concentrations by 1-2 courses. The median of peer institutions is 76 credit hours.

Institution	CH (Dept)	CH (Other)	Total CH
UNCA-Weather/Forecasting	43	26	69
UNCA-Climatology	43	26	69
UNCA-Broadcast Meteorology	37	34	71
MSUD (B.S. Meteorology)	43	37	80
Lyndon State University (Atmospheric Science/Graduate)	39	34	73
Lyndon State University (Atmospheric Science/NWS)	39	37	76
Lyndon State University (Atmospheric Science/Broadcast)	39	36	75
Lyndon State University (Atmospheric Science/Climate)	39	37	76
Millersville University	38	44	82
SUNY-Oswego	38	39	77
St. Cloud State University	46	32	78
Valparaiso University	40	23	63
Northland College	32	35	67

Table 2. Comparison of required credit hours for an atmospheric science/meteorology degree by institution.

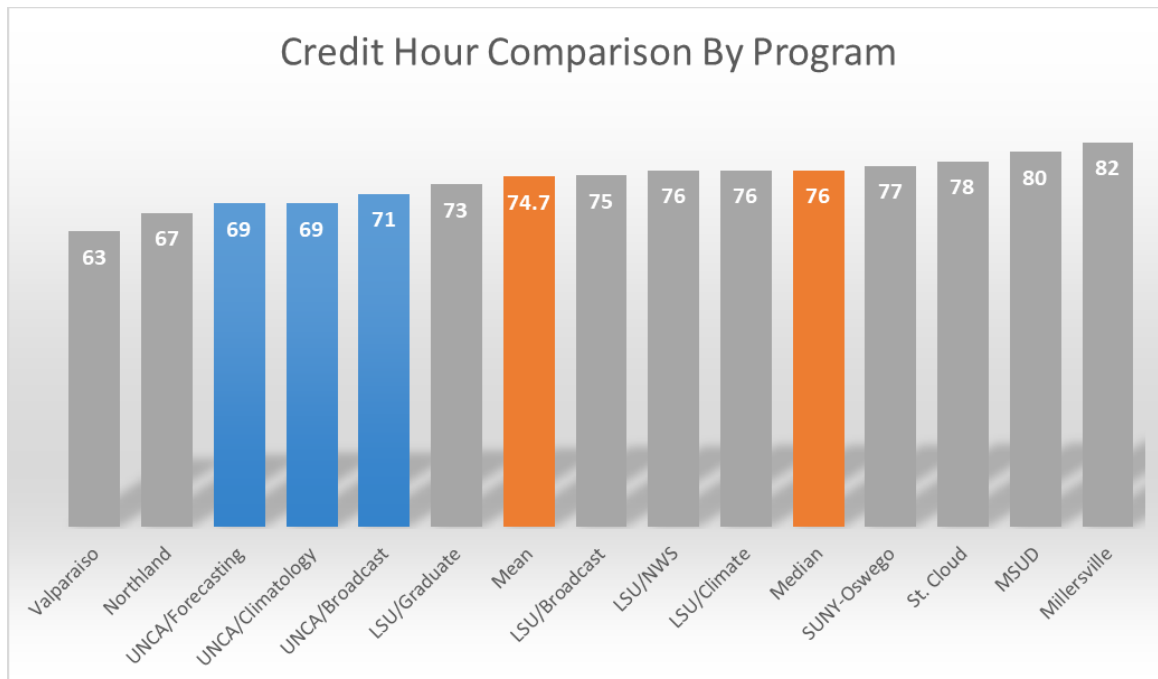


Figure 1. Graphical representation of data presented in Table 1. Note that the ATMS program credit hour requirements are lower than both the peer mean and median.

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b. Time to Graduation

There are no data readily available to assess the time to graduation of the peer institutions. However, we can demonstrate that despite the academic rigor of our course of study and the significant requirements of the Liberal Arts Core at UNC Asheville, our students complete our program in significantly less time than the average of other departments. Institutional data from 2013-2018 show that ATMS students on average took 4.1 years to graduate, compared to an average of 4.4 years for UNC Asheville as a whole. *This was tied for the **lowest** amount of time to graduate across all departments and programs on campus.* Clearly, the number of credit hours required of ATMS students does not constitute an unreasonable financial or academic burden on our students.

5. Four Year Curriculum Plan

A tentative four-year semester by semester plan of course offerings and instructors is shown in Table 3. Historically, ATMS has used very few adjuncts to cover its curriculum – even with recent professional development and family leaves (Hennon in 2014, Huang in 2017, Godfrey in 2018-19).

Fall 2020		Spring 2021		Fall 2021		Spring 2022	
ATMS 103	Miller	ATMS 103	Huang	ATMS 103	Godfrey	ATMS 103	Huang
ATMS 103	Godfrey	ATMS 103	Miller	ATMS 103	Huang	ATMS 103	Miller
ATMS 103	Huang	ATMS 103	Huang	ATMS 103	Hennon	ATMS 103	Godfrey
ATMS 111	Miller	ATMS 204	Miller	ATMS 111	Miller	ATMS 204	Godfrey
ATMS 113	Miller	ATMS 230	Godfrey	ATMS 113	Miller	ATMS 204	Hennon
ATMS 178	Hennon	ATMS 273	Huang	ATMS 178	Godfrey	ATMS 230	Godfrey
ATMS 178	Huang	ATMS 310	Hennon	ATMS 203	Miller	ATMS 273	Huang
ATMS 203	Huang	ATMS 328	Adjunct	ATMS 203	Huang	ATMS 310	Hennon
ATMS 223	Hennon	ATMS 350	Hennon	ATMS 305	Godfrey	ATMS 350	Hennon
ATMS 305	Godfrey	ATMS 355	Godfrey	ATMS 320	Godfrey	ATMS 383	Huang
ATMS 315	Huang	ATMS 383	Huang	ATMS 345	Hennon	ATMS 411	Miller
ATMS 320	Godfrey	ATMS 405	Godfrey	ATMS 383	Huang	ATMS 455	Godfrey
ATMS 383	Godfrey	ATMS 411	Miller*	ATMS 410	Miller	Elective	Miller
ATMS 410	Miller	ATMS 420	Hennon	ATMS 464	Hennon	Elective	Huang
ATMS 464	Hennon	ATMS 455	Godfrey	Elective	Huang	ATMS 499	Various
ATMS 499	Various**	ATMS 499	Various	ATMS 499	Various		

* Dr. Miller is provided 3 credit hours of release time each year for his National Science Foundation ACES scholarship grant

** ATMS 499 is the undergraduate research section. Each faculty member mentors a number of students conducting research

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Fall 2022		Spring 2023		Fall 2023		Spring 2024	
ATMS 103	Miller	ATMS 103	Huang	ATMS 103	Godfrey	ATMS 103	Huang
ATMS 103	Godfrey	ATMS 103	Miller	ATMS 103	Huang	ATMS 103	Miller
ATMS 103	Huang	ATMS 103	Huang	ATMS 103	Hennon	ATMS 103	Godfrey
ATMS 111	Miller	ATMS 204	Miller	ATMS 111	Miller	ATMS 204	Godfrey
ATMS 113	Miller	ATMS 230	Godfrey	ATMS 113	Miller	ATMS 204	Hennon
ATMS 178	Hennon	ATMS 273	Huang	ATMS 178	Godfrey	ATMS 230	Godfrey
ATMS 178	Huang	ATMS 310	Hennon	ATMS 203	Miller	ATMS 273	Huang
ATMS 203	Huang	ATMS 328	Adjunct	ATMS 203	Huang	ATMS 310	Hennon
ATMS 223	Hennon	ATMS 350	Hennon	ATMS 305	Godfrey	ATMS 350	Hennon
ATMS 305	Godfrey	ATMS 355	Godfrey	ATMS 320	Godfrey	ATMS 383	Huang
ATMS 315	Huang	ATMS 383	Huang	ATMS 345	Hennon	ATMS 411	Miller
ATMS 320	Godfrey	ATMS 405	Godfrey	ATMS 383	Huang	ATMS 455	Godfrey
ATMS 383	Godfrey	ATMS 411	Miller*	ATMS 410	Miller	Elective	Miller
ATMS 410	Miller	ATMS 420	Hennon	ATMS 464	Hennon	Elective	Huang
ATMS 464	Hennon	ATMS 455	Godfrey	Elective	Huang	ATMS 499	Various
ATMS 499	Various**	ATMS 499	Various	ATMS 499	Various		

* The tentative schedules for 2022-2024 repeat those shown in 2020-2022 since no major changes to the offerings are anticipated at this time.

Table 3. ATMS four-year course offering and staffing plan.

Complete course descriptions are found on the ATMS website:

<https://atms.unca.edu/course-descriptions>

As shown in the table, the high number of credit hours required for the GS-1340 policy leave very little room for flexibility for a four FTE department. Not shown are the onerous technical support requirements for the department that are shared amongst the faculty. The atmospheric science discipline requires vast amounts of data and computational capacity that require a dedicated technical support person. A request has been made for such a position but it is not known if it will be funded at this time.

At least one section of the freshman colloquium course (ATMS 178) will now be offered every fall and will rotate through the ATMS faculty. In recent years, the course was typically not offered every year because of the ACES National Science Foundation grant shared with CSCI. In alternating years, CSCI offered their own 178 section and we encourage all incoming ATMS and CSCI students to take that particular course. *By offering a streamlined curriculum with ATMS 203/204 replacing four separate classes, ATMS can now play a greater role in the liberal arts core.*

Not listed in Table 3 are ATMS 381, ATMS 382, and ATMS 490. These are internship courses like ATMS 383 but for different credit hours. Typically, the faculty member in charge of ATMS 383 will also be listed as the instructor for the other courses. As a department, we count all of the internship courses as one 3-credit hour load. Typically, we will have 1-5 students enrolled during the academic year.

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Appendix A – URL Addresses for Comparison Programs

Metropolitan State University of Denver (MSUD)

http://catalog.msudenver.edu/preview_program.php?catoid=23&poid=5485&returnto=1306

Lyndon State College

http://catalog.lyndonstate.edu/preview_program.php?catoid=26&poid=1502&returnto=487

Millersville University

<http://www.millersville.edu/esci/meteorology/degreeinfo.php>

SUNY-Oswego

http://catalog.oswego.edu/preview_program.php?catoid=36&poid=4303

St. Cloud State University

<https://catalog.stcloudstate.edu/Catalog/ViewCatalog.aspx?pageid=viewcatalog&catalogid=7&chapterid=530&topicgroupid=5007&loaduserredits=False>

Valparaiso University

<https://www.valpo.edu/geography-meteorology/meteorology/degree-programs/>

Northland College

http://catalog.northland.edu/preview_program.php?catoid=17&poid=1162&returnto=809