April 8, 2025

Cort Anastasio
Chair, Atmospheric Science

RE: Atmospheric Science Degree Requirements

Enclosed is a copy of the Atmospheric Science degree requirements as approved by Graduate Council on April 4, 2025. These degree requirements are now the revised, official document for Atmospheric Science and will be posted to the Graduate Studies program webpage: https://grad.ucdavis.edu/programs/gatm.

Thank you for your efforts on behalf of graduate education.

Sincerely,

Eleonora Grandi
Chair, Graduate Council

c: Duncan Temple Lang, Associate Dean for Graduate Programs, Graduate Studies
Jasmine Bonite, Director of Policy and Programs, Graduate Studies
Ruby Bal, Project Policy Analyst, Graduate Studies
Shila Ruiz, Graduate Program Coordinator, Atmospheric Science

ATMOSPHERIC SCIENCES GRADUATE GROUP
Ph.D. AND M.S. DEGREE REQUIREMENTS
Revision Dates: May 20, 2004; April 8, 2016; October 18, 2019; May 23, 2022; November 7, 2024
Approved by Graduate Council: April 4, 2025

Master's Degree Requirements

1) Admissions Requirements

Consideration for program admission requires a bachelor's degree with a minimum 3.0 grade point average, three letters of recommendation, official transcripts, English language examination scores (if applicable), and a Graduate Studies online application and fee by the stated admission deadline. The English proficiency exam (TOEFL or other University-approved exam) is required for international applicants who have not studied at an English-speaking institution. Most successful applicants have a TOEFL score of 100 or higher, above the university minimum of 80. However, admissions decisions are made on a case-by case basis based on a holistic review of each candidate's application. Meeting some or all the criteria above does not guarantee admission, but merely eligibility. The decision to recommend admission to the Dean of Graduate Studies is made by the Atmospheric Sciences Graduate Group (ASGG) Admissions Committee, in consultation with the ASGG faculty, based on available space and competitiveness of an applicant compared to the eligible pool.

a) Prerequisites

In addition to the admission requirements stated above, applicants are expected to have passed the equivalent of the following UC Davis quarter-long courses:

MAT 21A	Calculus	4 units
MAT 21B	Calculus	4 units
MAT 21C	Calculus	4 units
MAT 21D	Vector Analysis	4 units
PHY 9B	Classical Physics	5 units

Applicants missing these prerequisites should make them up prior to enrolling in the program. Up to three prerequisites can be taken in the first year of enrollment. Note that the five prerequisite courses listed above also have their own prerequisites.

b) Deficiencies

Students missing prerequisite courses should take them prior to enrollment. Any remaining coursework deficiencies should be made up by the end of the first academic year following initial enrollment. Prerequisite courses taken at UC Davis cannot be taken S/U unless this is approved as an exception by Graduate Council (https://ucdavis.app.box.com/v/GC2006-01-SU).

2) M.S. Degree: Master's Plan I (Thesis) and Plan II (Examination)

Plan I (Thesis Plan). This plan requires a minimum of 30 units of graduate and upper division courses (i.e., 100- and 200-level courses), of which at least 12 units must be graduate-level courses (200-level) in the major field. This plan also requires at least 6 units of research (ATM 299), which do not count toward the unit requirements, and a thesis, which serves as the capstone requirement.

Plan II (Exam Plan). This plan requires a minimum of 36 units of graduate and upper division courses (i.e., 100- and 200-level courses), of which at least 18 units must be graduate work in the major field. Units of research (299 or equivalent) are not required, but up to 6 units may be used to satisfy the 18-graduate-unit requirement and the 36-total-unit requirement. This plan also requires a comprehensive final examination in the major subject, which serves as the capstone requirement.

3) Course Requirements (30 total units)

a) Core Requirements (15-20 units required)

Core Courses: MS students are required to take at least one class from each of the five categories below, which encompass the main areas of the atmospheric sciences. Within each category, students must take one of the courses marked by the asterisk (*) unless the equivalent course was taken in a prior program. Additional courses to those listed below may be available. A "B" grade average or better is required for the core courses. Depending on the choice of core courses, the total number of core units will be between 15 and 20.

<u>Dynamics</u>		
ATM 111	Weather Analysis and Prediction	3 units
ATM 121A	Atmospheric Dynamics I (*)	4 units
ATM 121B	Atmospheric Dynamics II	4 units
ATM 221	Advanced Atmospheric Dynamics	3 units
ATM 250	Mesoscale Meteorology	3 units
<u>Climate</u>		
ATM 115	Hydroclimatology	3 units
ATM 116	Modern Climate Change	3 units
ATM 215	Advanced Hydroclimatology	3 units
ATM 240	General Circulation of the Atmosphere	4 units
ATM 241	Climate Dynamics	3 units
ATM 245	Climate Change Science and Impacts (*)	4 units
<u>Atmospheric Chemistry/Air Quality</u>		
ATM 149	Air Pollution	4 units
ATM 160	Introduction to Atmospheric Chemistry (*)	4 units
ATM 231	Advanced Air Pollution Meteorology	3 units
ATM 260	Atmospheric Chemistry	3 units

ECI 242	Air Quality	4 units
ECI 247	Aerosols	4 units
ECI 241	Environmental Reactive Chemical Transport Modeling	4 units

Biometeorology/Boundary Layer

ATM 124	Meteorological Instruments and Observations	3 units
ATM 133	Biometeorology (*)	4 units
ATM 158	Boundary Layer Meteorology (*)	4 units
ATM 223	Advanced Boundary Layer Meteorology	3 units
ATM 233	Advanced Biometeorology	3 units
ECI 289I	Introduction to Turbulence	4 units

Atmospheric Physics

ATM 120	Atmospheric Thermodynamics and Cloud Phys. (*)	4 units
ATM 128	Radiation and Satellite Meteorology (*)	4 units
ATM 230	Atmospheric Turbulence	3 units
ATM 244	Cloud and Precipitation Physics	3 units

b) Elective Courses (10 – 15 units)

Plan I (Thesis Plan). This plan requires additional graduate and upper division undergraduate elective courses chosen to satisfy the four requirements below. Depending on the total number of units of core courses taken, students are required to take between 10 and 15 units of elective courses, for a minimum of 30 total units. The research thesis serves as the capstone requirement. At least 6 units of research (299 or equivalent) are required, but they do not count towards the elective course requirement. The following four elective course requirements must be met:

i) Graduate and upper division units beyond the core coursework to complete the 30-unit total courses requirement. These elective courses should be chosen with the advice and consent of the Major Professor and/or the ASGG Graduate Advisor.
ii) At least 12 units of elective courses must be graduate-level courses that are either in ATM, instructed by an ASGG-affiliated faculty member, or approved by the ASGG Graduate Advisor. These courses are part of requirement i. above.
iii) A maximum of 3 units can be taken as S/U.
iv) At least 2 units, and at most 4 units, of ATM 290 during which students must give at least one formal in-class oral presentation. More details are provided in the ASGG Seminar Guidelines available on the ASGG website.

Plan II (Exam Plan). This plan requires additional graduate and upper division elective courses (100 and 200 series only) chosen to satisfy the four requirements below. Depending on the total number of units of core courses taken, students are required to take between 16 and 21 units of elective courses, for a minimum of 36 total units. At least 18 units of this total of 36 must be at the graduate level. The capstone requirement is fulfilled by successfully passing the MS comprehensive examination. No thesis is required. No more than 6 units of research (299 or equivalent) may be used to satisfy the graduate-unit and total-unit requirements.

i) Graduate and upper division units to complete the 36-unit total courses requirement, chosen with the advice and consent of the Major Professor and/or the ASGG Graduate Advisor.
ii) At least 12 units of elective courses must be graduate-level courses that are either in ATM, instructed by an ASGG-affiliated faculty member, or approved by the ASGG Graduate Advisor. These courses may also be used to satisfy requirement i. above.
iii) A maximum of 3 units can be taken as S/U.
iv) At least 2 units, and at most 4 units, of ATM 290 during which students must give at least one formal in-class oral presentation. More details are provided in the ASGG Seminar Guidelines document available on the ASGG website.

c) Research

Plan I (Thesis Plan). At least 6 units of ATM 299 are required. These should be taken with the faculty member who is guiding the student's research. Note that ATM 299 units do not count toward the requirements of 12 units of graduate-level coursework and 30 total units.

Plan II (Exam Plan). ATM 299 is not required, but up to 6 units can be used towards the graduate-unit requirement of 18 units and the total-unit requirement of 36 units.

d) English Language Requirement

Any student who does not meet the English proficiency criteria described in the Graduate Student Course Requirements – English as Second Language Policy (GC2018-02) is required to enroll in an appropriate English language course as listed in the policy. Any courses taken in satisfaction of this requirement do not count towards the units required for graduation.

e) Summary

Plan I (Thesis Plan): 15-20 units of Core + 10-15 units of Elective = 30 total units. Students are required to take at least one class in each of the five core course categories: dynamics, climate, atmospheric chemistry/air quality, biometeorology/boundary layer, and atmospheric physics. Within each category, students must take one of the courses marked by the asterisk (*) unless the equivalent course was taken in a prior program. Additional courses must be taken to satisfy the elective requirement and the 30-total-unit requirement. For the elective courses: at least 12 units must be graduate-level courses that are either designated ATM, instructed by an ASGG-affiliated faculty member, or otherwise approved by the ASGG Graduate Advisor; at least 2, and at most 4, units of ATM 290 are required, during which students must give at least one formal in-class oral presentation. At least 6 units of research units (299 or equivalent) are required, but these do not count towards the required elective courses or the 30-total-unit requirement.

Full-time students must enroll for 12 units per quarter including research, academic courses, and seminar units. Courses that fulfill any of the program course requirements may not be taken S/U unless that is the normal grading mode for the course. For courses where S/U is the normal grading mode, up to 3 units may contribute to the degree

requirements. Once the course requirements are completed, students can take additional classes if desired, although at this point the required 12 units per quarter are generally fulfilled with research units (ATM 299) and perhaps seminars. Per UC regulations, students cannot enroll in more than 12 units of graduate level courses (200) or more than 16 units of combined undergraduate and graduate level (100, 200, 300) courses per quarter.

Plan II (Exam Plan): 15-20 units of Core + 16-21 units of Elective = 36 total units. Students are required to take at least one class in each of the five core course topical areas: dynamics, climate, atmospheric chemistry/air quality, biometeorology/boundary layer, and atmospheric physics. Within each category, students must take one of the courses marked by the asterisk (*) unless the equivalent course was taken in a prior program. Additional courses must be taken to satisfy the elective requirements and the 36-total-unit requirement. For the elective courses, at least 12 units must be graduate-level courses that are either designated ATM, instructed by an ASGG-affiliated faculty member, or otherwise approved by the ASGG Graduate Advisor. At least 2, and at most 4, units of ATM 290 are required, during which students must give at least one formal in-class oral presentations. Research units (299 or equivalent) do not count towards the required elective courses.

Full-time students must enroll for 12 units per quarter including research, academic, and seminar units. Courses that fulfill any of the program course requirements may not be taken S/U unless that is the normal grading mode for the course. For courses where S/U is the normal grading mode, up to 3 units may contribute to the degree requirements. Once the course requirements are completed, students can take additional classes if desired or seminars. Per UC regulations, students cannot enroll in more than 12 units of graduate level courses (200) or more than 16 units of combined undergraduate and graduate level (100, 200, 300) courses per quarter.

4) Special Requirements

All MS students must give at least one formal oral presentation as part of an ATM 290 seminar series.

5) Advising Structure and Mentoring

The **Major Professor** is the faculty member who supervises the student's research and thesis; the Major Professor serves as the Chair of the Thesis Committee. The **Graduate Advisor** is a faculty member with signatory authority appointed by Graduate Studies who is a resource for information on academic requirements, policies and procedures, and registration. Students should work with the Graduate Advisor that was assigned to them by the Graduate Group. The **Graduate Program Coordinator** is a staff member who assists students with identifying a Major Professor, identifying appointments, and understanding general university policies. **Mentoring Guidelines** can be found in the graduate student handbook on the ASGG website.

6) Committees

a) Admissions Committee

Applications will be evaluated by the Admissions Committee, which consists of a minimum of 3 members of the graduate group, appointed by the Executive Committee (see 6b below) per ASGG by-laws. Based on a holistic review of the entire application, the Admissions Committee, in consultation with the ASGG Chair and faculty, recommends accepting or declining an applicant's request for admission. That recommendation is forwarded to the Dean of Graduate Studies for final approval. Notification of admissions decisions will be sent by Graduate Studies. Application deadlines are listed at https://grad.ucdavis.edu/program-application-deadlines.

b) Course Guidance Committee

ASGG does not use course guidance committees; instead, plans for coursework are made in conjunction with a student's Graduate Advisor and Major Professor. If a student has not identified a Major Professor prior to their first quarter, they should discuss their first-quarter course plan with their Graduate Advisor. Students should identify a Major Professor by the end of the first quarter of enrollment if possible. If a student is having difficulty identifying a Major Professor, they should discuss this with their Graduate Advisor and/or the group chair. After the student has identified a Major Professor, the ASGG Graduate Advisor and Major Professor will assist the student in developing a study plan. The plan will be completed within the first year of starting in the program.

Plan II MS students will generally not have a Major Professor, although they can do some research as part of their degree. Plan II MS students will meet with their ASGG Graduate Advisor to develop a study plan for their time in the program. This should be developed by the end of the second quarter.

c) Thesis Committee (for Plan I MS) and Comprehensive Examination Committee (for Plan II MS)

Thesis Committee. The student, in consultation with their Major Professor and ASGG Graduate Advisor, nominates 3 faculty members to serve on the Thesis Committee. The nominations are submitted to the Office of Graduate Studies for formal appointment in accordance with Graduate Council policy. The Major Professor serves as Chair of the committee.

Comprehensive Examination Committee. The ASGG Chair shall appoint three faculty members to serve on the Comprehensive Exam Committee for all students and appoint one of the three to serve as committee chair. The Major Professor can be a member of the committee, but at least one of the members should have no vested interest in the outcome, i.e., the student was not their GSR or collaborator. Substitutions in the committee membership for an individual student will only be made in the case that all committee members have a vested interest in the exam outcome.

7) Advancement to Candidacy

Every student must file an official application for Candidacy for the Degree of Master of Science and pay the Candidacy Fee after completing one-half of their course requirements and at least one quarter before completing all degree requirements; this is in the 5th quarter for MS Plan I students and the 3rd quarter for MS Plan II students.

The form for the Candidacy for the Master's Degree must be submitted via GradSphere: https://gradsphere.ucdavis.edu/. A completed form includes a list of courses the student will take to complete the degree requirements. If changes must be made to the student's course plan after s/he has advanced to candidacy, the ASGG Graduate Advisor must recommend these changes to Graduate Studies. Students must have their ASGG Graduate Advisor and committee Chair sign the candidacy form before it can be submitted to Graduate Studies.

If the candidacy is approved, Graduate Studies will send a copy to the Graduate Program Coordinator and the student; the Thesis Committee Chair will also receive a copy, if applicable. If Graduate Studies determines that a student is not eligible for advancement, the graduate group and the student will be told the reasons for the application's deferral. Some reasons for deferring an application include grade point average below 3.0, outstanding "I" grades in required courses, or insufficient units.

8) Thesis and/or Comprehensive Examination Requirements

a) Thesis Requirements (Plan I)

Thesis committee meetings: The candidate and Major Professor will meet at least once a year with the other members of the thesis committee to discuss progress and any changes in research objectives. The candidate and Major Professor are expected to meet regularly throughout the student's MS work.

Thesis: Research for the Master's thesis is to be carried out under the supervision of a faculty member of the program and must represent an original contribution to knowledge in the field. The thesis research must be conducted while the student is enrolled in the program. The thesis should demonstrate the student's ability to pose a sound scientific hypothesis, test the hypothesis using scientific methods, and reach logical conclusions. The thesis is submitted to the thesis committee at least one month before the student plans to make requested revisions; committee members must provide feedback within four weeks of receipt of the thesis, per the *Policy on Service on Advanced Degree Committees (GC1998-01)*. This does not include summer months for committee members having nine-month appointments. Once returned, the student will make necessary revisions and return the thesis to the committee for approval or additional revisions. Students should provide a timeline, developed in consultation with their Major Professor, to the committee at least one quarter before the student expects to graduate. The Major Professor or Graduate Advisor should intervene in cases where faculty are not meeting the required timeline. All committee members must approve the thesis and sign the title page before the thesis is submitted to Graduate Studies for final approval. Should the student fall short of making satisfactory progress on the thesis at any point in time, the

Major Professor or the Graduate Advisor should submit an annual assessment, or one or more interim assessments, to Graduate Studies that describes the marginal or unsatisfactory assessment of the student's progress. Should the committee determine at any point that the student's progress is unacceptable for continuation in the program, even with substantial revisions to the work, the program may recommend to the Dean of Graduate Studies that the student be disqualified from the program.

The thesis must be filed in a quarter in which the student is registered or on filing fee. Instructions on preparation of the thesis and a schedule of dates for filing the thesis in final form are available from Graduate Studies; the dates are also printed in the UC Davis General Catalog and in the Class Schedule and Registration Guide issued each quarter. A student must have a GPA of at least 3.0 for the M.S. degree to be awarded.

Exit Seminar: In the quarter in which the thesis is filed, or on a date as agreed to by the thesis committee chair, the student is required to present the results of the thesis work in an exit seminar. This seminar may be given as part of ATM 290 or held independently. The exit seminar requirement must be completed prior to the signing of the thesis.

b) Comprehensive Examination (Plan II)

Plan II requires satisfactory completion of a written comprehensive examination. The MS comprehensive exam committee, which is appointed by the ASGG Chair, establishes the contents of the exam. A student may take the comprehensive examination once they have advanced to candidacy. However, it is important that the exam is completed at or near the end of the course work of the Master's Plan II degree. More details about the exam are provided in the ASGG Comprehensive Examination Guidelines available on the ASGG website.

To pass the MS comprehensive exam, the committee must reach a unanimous decision to do so. A student who fails the MS comprehensive exam the first time may retake the exam one more time at the next available offering. A student who fails the exam the second time will be recommended for disqualification from further graduate work in the program to the Dean of Graduate Studies.

The Qualifying Exam is considered equivalent to the MS comprehensive exam, for doctoral students. Doctoral students who have passed the Qualifying Exam may petition for an MS Plan II degree so long as they meet all the degree requirements and any other campus criteria (see Ph.D. degree requirements).

Once passed, the Master's Report Form is signed by the Program Graduate Advisor and then forwarded to the Office of Graduate Studies. The deadlines for completing this requirement are listed each quarter in the campus General Catalog (available online at the website of the Office of the Registrar). A candidate must be a registered student or in Filing Fee status at the time the program submits the form, with the exception of the summer period between the end of the Spring Quarter and the beginning of Fall Quarter. The program must file the report with Graduate Studies within one week of the end of the quarter in which the student's degree will be conferred.

9) Normative Time to Degree

Plan I: Normative time to degree is 6 quarters: 5 quarters being Normative Time to Advancement to Candidacy and 1 quarter being Normative Time in Candidacy.

Plan II: Normative time to degree is 4 quarters: 3 quarters being Normative Time to Advancement to Candidacy and 1 quarter being Normative Time in Candidacy.

10) Typical Timeline and Sequence of Events

Note: Students must be enrolled in a minimum of 12 units (including 290 and 299) each academic quarter.

Plan I MS Timeline

	Fall	**Winter**	**Spring**
Year 1	ATM 120 (4 units)	ATM 121A (4 units)	ATM 158 (4 units)
	ATM 245 (4 units)	ATM 160 (4 units)	200 level course (4 units)
	ATM 299 (4 units)	ATM 299 (4 units)	ATM 290 (1 unit)
			ATM 299 (3 units)
TOTAL	12 units	12 units	12 units
Year 2	**Fall**	**Winter** (Advancement to MS candidacy)	**Spring** (Completion of thesis)
	200 level course (4 units)	200 level course (4 units)	ATM 299 (12 units)
	ATM 290 (1 unit)	ATM 299 (8 units)	
	ATM 299 (7 units)		
TOTAL	12 units	12 units	12 units

Plan II MS Timeline

	Fall	**Winter**	**Spring** (Advancement to MS candidacy)
Year 1	ATM 120 (4 units)	ATM 121A (4 units)	ATM 158 (4 units)
	ATM 245 (4 units)	ATM 160 (4 units)	100 or 200 level course (3 units)
	100 or 200 level course (3 units)	200 level course (4 units)	200 level course (4 units)
	ATM 290 (1 unit)		ATM 290 (1 unit)
TOTAL	12 units	12 units	12 units

Year 2	**Fall** (Comprehensive Exam completed)
	200 level course (3 units)
	100 level course (2 units)
	ATM 290 (1 unit)
	ATM 299 (6 units)
TOTAL	12 units

Students with significant deficiencies in prerequisite coursework upon enrollment in the program will take longer to complete their degrees.

11) Sources of Funding

Students may be funded through a combination of fellowships, graduate student researcher (GSR) appointments, and serving as a teaching assistant (TA). Plan II MS students are primarily self-funded, but they can also have quarters when they serve as a GSR or TA or have fellowship funding.

12) PELP, In Absentia, and Filing Fee Status

Information about PELP (Planned Educational Leave Program), In Absentia (reduced fees when researching out of state), and Filing Fee status can be found in the Graduate Student Guide: https://grad.ucdavis.edu/.

13) Academic Accommodations

Students requiring academic accommodations to complete degree requirements must register with the Student Disability Center (SDC) and initiate the interactive accommodation process. Academic accommodations cannot be granted retroactively, and it is the student's responsibility to follow the appropriate process for requesting accommodations in advance of needing them to complete a degree requirement (e.g., coursework, comprehensive exam, etc.).

14) Co-Authorship Policy from Graduate Council

In accordance with Graduate Council Policy., MS theses and Ph.D. dissertations can include material that is wholly or in part co-authored and/or collaborative. The thesis/dissertation committee will certify that the student's contributions to these works are sufficient and the equivalent of a single-authored thesis or dissertation chapter. The contributions of the student should be clearly indicated within the thesis and dissertation in the acknowledgements or the introduction. Published, accepted, in-preparation, or other works included in the thesis/dissertation are governed by this policy. Faculty in the ASGG may not require prior publication, submission, or presentation in refereed venues as a requirement for the MS or Ph.D. degree, but they may require these for conditions of employment.

Ph.D. Degree Requirements

1) Admissions Requirements

Consideration for program admission requires a bachelor's degree with a minimum GPA 3.0 grade point average, three letters of recommendation, official transcripts, English language examination scores (if applicable), and a Graduate Studies online application and fee by the stated admission deadline. The English proficiency exam (TOEFL or other University approved exam, if applicable) is required for international applicants who have not studied at an English-speaking institution. Most successful applicants have a TOEFL score of 100 or higher, above the university minimum of 80. However, admissions decisions are made on a case-by-case basis based on a holistic review of each candidate's application. Meeting some or all the criteria above does not guarantee admission, but merely eligibility. The decision to recommend admission to the Dean of Graduate Studies is made by the Atmospheric Sciences Graduate Group (ASGG) Admissions Committee, in consultation with the ASGG faculty, based on available space and competitiveness of an applicant compared to the eligible pool.

a) Prerequisites

In addition to the admission requirements stated above, applicants are expected to have passed the equivalent of the following UC Davis courses:

MAT 21A	Calculus	4 units
MAT 21B	Calculus	4 units
MAT 21C	Calculus	4 units
MAT 21D	Vector Analysis	4 units
PHY 9B	Classical Physics	5 units

Applicants missing these prerequisites should make them up prior to enrolling in the program. Up to three prerequisites can be taken in the first year of enrollment. Note that the five prerequisite courses listed above also have their own prerequisites.

b) Deficiencies

Students missing prerequisite courses should take them prior to enrollment. Any remaining coursework deficiencies should be made up by the end of the first academic year following initial enrollment. Prerequisite courses taken at UC Davis cannot be taken S/U unless this is approved as an exception by Graduate Council (https://ucdavis.app.box.com/v/GC2006-01-SU).

2) Dissertation Plan

The Atmospheric Sciences Graduate Group offers a Plan A Ph.D., which requires a five-member (minimum) dissertation/final examination committee, an exit seminar, and a final oral examination.

3) C.Phil. – The Candidate in Philosophy Degree

This degree type is not offered by the Atmospheric Sciences Graduate Group.

4) Course Requirements – (total of 36 units)

Students are required to take both Core and Elective courses. Classes taken prior to enrollment in the Ph.D. program can count towards these requirements and their accompanying units if they meet five requirements: (i) the class is equivalent to a course that would be taken as a core or elective course, (ii) the class was not taken to fulfill an undergraduate degree requirement, (iii) the student received a B grade or better in the class, (iv) the class was taken within 5 years of starting in the Atmospheric Sciences Ph.D. program, and (v) the request is approved by the student's Graduate Advisor and the instructor of the equivalent course at UC Davis. Classes taken as part of a prior graduate degree can count towards the ASGG Ph.D. course requirements. If the first four requirements above are met, then the student submits a written request to their Graduate Advisor explaining which qualified course(s) the student has taken (including their syllabi) and which current requirements (courses and units) they are seeking credit for. The request will then be considered by the Advisor and instructor(s). Students can count up to 12 previous units towards the Ph.D. requirements. As part of their Qualifying Exam, students are expected to demonstrate strong knowledge of required coursework, including for prior courses that count towards the degree requirements.

a) Core Courses (15 - 20 units required)

Ph.D. students are required to take at least one class from each of the five categories below, which encompass the main areas of the atmospheric sciences. Within each category, students must take one of the courses marked by the asterisk (*) unless the equivalent course was taken in a prior program. Additional courses to those listed below may be available. A "B" grade average or better is required for the core courses. Depending on the choice of core courses, the total number of core units will be between 15 and 20.

<u>Dynamics</u>

ATM 111	Weather Analysis and Prediction	3 units
ATM 121A	Atmospheric Dynamics I (*)	4 units
ATM 121B	Atmospheric Dynamics II	4 units
ATM 221	Advanced Atmospheric Dynamics	3 units
ATM 250	Mesoscale Meteorology	3 units

<u>Climate</u>

ATM 115	Hydroclimatology	3 units
ATM 116	Modern Climate Change	3 units
ATM 215	Advanced Hydroclimatology	3 units
ATM 240	General Circulation of the Atmosphere	4 units
ATM 241	Climate Dynamics	3 units
ATM 245	Climate Change Science and Impacts (*)	4 units

Atmospheric Chemistry/Air Quality

ATM 149	Air Pollution	4 units
ATM 160	Introduction to Atmospheric Chemistry (*)	4 units
ATM 231	Advanced Air Pollution Meteorology	3 units
ATM 260	Atmospheric Chemistry	3 units
ECI 242	Air Quality	4 units
ECI 247	Aerosols	4 units
ECI 241	Environmental Reactive Chemical Transport Modeling	4 units

Biometeorology/Boundary Layer

ATM 124	Meteorological Instruments and Observations	3 units
ATM 133	Biometeorology (*)	4 units
ATM 158	Boundary Layer Meteorology (*)	4 units
ATM 223	Advanced Boundary Layer Meteorology	3 units
ATM 233	Advanced Biometeorology	3 units
ECI 289I	Introduction to Turbulence	4 units

Atmospheric Physics

ATM 120	Atmospheric Thermodynamics and Cloud Phys. (*)	4 units
ATM 128	Radiation and Satellite Meteorology (*)	4 units
ATM 230	Atmospheric Turbulence	3 units
ATM 244	Cloud and Precipitation Physics	3 units

b) Elective Courses (16 – 21 units required)

The Ph.D. degree requires additional graduate and upper division undergraduate elective courses chosen to satisfy the four requirements below. Depending on the total number of units of core courses taken, students are required to take between 16 and 21 units of elective courses, for a minimum of 36 total units. In addition, a dissertation is required and serves as the capstone requirement. At least 12 units of research (299 or equivalent) are required, but they do not count towards the elective-course requirement or the total-unit requirement. The following elective-course requirements must be met:

i) Graduate and upper division units beyond the core coursework to complete the 36-unit total courses requirement. These elective courses should be chosen with the advice and consent of the Major Professor and/or the ASGG Graduate Advisor.
ii) At least 12 units of elective courses must be graduate-level courses that are either in ATM, instructed by an ASGG-affiliated faculty member, or approved by the ASGG Graduate Advisor. These courses are part of requirement i. above.
iii) A maximum of 3 units can be taken as S/U.
iv) At least 2 units, and at most 4 units, of ATM 290 during which students must give at least one formal in-class oral presentation. More details are provided in the ASGG Seminar Guidelines available on the ASGG website (https://atm.ucdavis.edu/download_file/323/0).

c) Research

At least 12 units of ATM 299 are required. These should be taken with the faculty member who is guiding the student's research. Note that ATM 299 units do not count toward the elective requirement or the requirement of 36 total units.

d) English Language Requirement

Any student who does not meet the English proficiency criteria described in the Graduate Student Course Requirements – English as Second Language Policy (GC2018-02) is required to enroll in an appropriate English language course as listed in the policy. Any courses taken in satisfaction of this requirement do not count towards the units required for graduation.

e) Summary: 15-20 units of Core + 16-21 units of Elective = 36 total units

Students are required to take at least one class in each of the five core course categories: dynamics, climate, atmospheric chemistry/air quality, biometeorology/boundary layer, and atmospheric physics. Within each category, students must take one of the courses marked by the asterisk (*) unless the equivalent course was taken in a prior program. Additional courses must be taken to satisfy the elective requirement and the 36-total-unit requirement. For the elective courses: at least 12 units must be graduate-level courses that are either designated ATM, instructed by an ASGG-affiliated faculty member, or otherwise approved by the ASGG Graduate Advisor; at least 2, and at most 4 units, of ATM 290 are required, during which students must give at least one formal in-class oral presentation. At least 12 units of research (299 or equivalent) are required, but these do not count towards the required elective course units. Full-time students must enroll for 12 units per quarter including research, academic, and seminar units. Courses that fulfill any of the program course requirements may not be taken S/U unless that is the normal grading mode for the course. For courses where S/U is the normal grading mode, up to 3 units may contribute to the degree requirements. Once the course requirements are completed, students can take additional classes as needed, although at this point the required 12 units per quarter are generally filled with research units (ATM 299) and perhaps seminars. Per UC regulations, students cannot enroll in more than 12 units of graduate level courses (200) or more than 16 units of combined undergraduate and graduate level (100, 200, 300) courses per quarter.

5) Special Requirements

All Ph.D. students must give at least one formal oral presentation as part of an ATM 290 seminar series.

6) Advising Structure and Mentoring

The **Major Professor** is the faculty member who supervises the student's research and thesis; the Major Professor serves as the Chair of the Dissertation Committee. The **Graduate Advisor** is a faculty member with signatory authority appointed by Graduate Studies who is a resource for information on academic requirements, policies and procedures, and registration. Students should work with the Graduate Advisor that was assigned to them by the Graduate Group. The **Graduate Program Coordinator** is a staff member who assists

students with identifying a Major Professor, identifying appointments, and understanding general university policies. **Mentoring Guidelines** can be found in the graduate student handbook on the ASGG website.

7) Committees

a) Admissions Committee

Applications will be evaluated by the Admissions Committee, which consists of a minimum of 3 members of the graduate group, appointed by the Executive Committee per ASGG by-laws. Based on a holistic review of the entire application, the Admissions Committee, in consultation with the ASGG Chair and faculty, recommends accepting or declining an applicant's request for admission. That recommendation is forwarded to the Dean of Graduate Studies for final approval. Notification of admissions decisions will be sent by Graduate Studies. Application deadlines are listed at https://grad.ucdavis.edu/program-application-deadlines.

b) Course Guidance Committee

The ASGG Graduate Advisor and the Major Professor together constitute the Course Guidance Committee, which will assist the student in developing a study plan. The plan should be completed within the first year of enrollment in the program.

c) Preliminary Examination Committee

The Atmospheric Science Graduate Group does not have a Preliminary Exam.

d) Qualifying Examination Committee

The Qualifying Examination (QE) Committee is recommended by the ASGG Graduate Advisor in consultation with the candidate and the prospective or current Major Professor. This recommendation is submitted to Graduate Studies for approval in accordance with Academic Senate regulations. The QE Committee is composed of 5 members, including at least 3 members from the Atmospheric Sciences Graduate Group, and at least 1 member from outside the group. The student's prospective or current Major Professor may not be the Chair of this committee but may be a member of the committee.

e) Dissertation Committee

The student, in consultation with their Major Professor and their Graduate Advisor, nominates 5 faculty members to serve on the Dissertation Committee. The dissertation committee must include at least 3 members from the Atmospheric Sciences Graduate Group, and at least 1 member from outside of the group. The nominations are submitted to the Office of Graduate Studies for formal appointment in accordance with Graduate Council policy. The Major Professor serves as Chair of the committee. At least three members of the committee serve as "Reading Members", who will read the dissertation (within four weeks of its submission) and sign its title page once they approve of the dissertation. Two additional members are "Final Exam Only" members, who will not

sign the dissertation title page. All committee members will participate in the oral final examination.

8) Advancement to Candidacy

Before advancing to candidacy for a doctoral degree, a student must have: (1) satisfied all requirements set by the graduate program; (2) maintained a minimum GPA of 3.0 in all course work (except those courses graded S/U); and (3) have passed the Qualifying Exam. Students should pass their QE by the end of the 9th quarter in order to remain eligible for academic appointments (teaching assistant, graduate student researcher, associate in, etc.). The student must file the appropriate paperwork with the Office of Graduate Studies and pay the candidacy fee to be officially advanced to Ph.D. Candidacy. Refer to the Graduate Council policy on Doctoral Qualifying Examinations (GC2005-02) for further details.

9) Qualifying Examination and Dissertation Requirements

a) Preliminary Examination

The program does not have a Preliminary Exam.

b) Qualifying Examination (QE)

i) General Information

All students must complete all course requirements before taking their Qualifying Examination (QE). General requirements for all QEs are described in the Graduate Council Doctoral Qualifying Examinations Policy (GC2005-02). Passing the QE makes the student eligible for advancement to candidacy. The QE is expected to be taken by the 8th quarter, and no later than the end of the 9th quarter, after admission to the Ph.D. program.

The primary purpose of the QE is to validate that the student is academically qualified to conceptualize a research topic, undertake scholarly research and successfully produce the dissertation required for a doctoral degree. The QE must evaluate the student's command of the field, ensuring that the student has both breadth and depth of knowledge, and must not focus solely on the proposed dissertation research. In addition, the QE provides an opportunity for the committee to provide important guidance to the student regarding their chosen research topic.

Students must complete all course requirements before taking their Qualifying Examination. The Qualifying Examination is administered by the student's QE Committee. The student submits an Application for Qualifying Examination to the ASGG Graduate Advisor or program chair at least six weeks prior to the oral examination date. Under no circumstances should a student take the Qualifying Examination before receiving formal notice of Admission to the Qualifying Examination from the Dean of Graduate Studies. As part of this form, the QE Committee is recommended by the ASGG Graduate Advisor in consultation with the candidate and their prospective or current Major Professor and submitted to Graduate

Studies for approval in accordance with Academic Senate regulations. The committee is composed of 5 members, including at least 3 members from the Atmospheric Sciences Graduate Group, and at least 1 member from outside of the group. The student's Major Professor may not be the Chair of this committee but may be a member of the committee. The Qualifying Examination consists of a written prospectus and an oral exam.

ii) Written Portion of the Exam – Dissertation Prospectus

The Prospectus is a description of a student's planned dissertation research projects. It cannot exceed 12 single-spaced pages - including figures, tables and appendices – and must have a font size no smaller than 11-point Times Roman (or equivalent). References are not included in the 12-page limit. In general, a prospectus should include: an introduction to the topic (including a survey of the relevant literature), a hypothesis or set of questions to be addressed, methods to be used to address the hypothesis/questions, any preliminary results, the expected advancement to atmospheric sciences and broader impacts to society resulting from the research, and cited references. Concepts within the research proposal can be discussed with others (such as the student's Major Professor and peers), but the writing of the proposal should be solely the student's work (i.e., no editorial assistance is allowed) as the proposal will serve as evidence of the student's proficiency in scientific writing. The qualifying exam committee will be responsible for assessing that the student's writing proficiency is satisfactory before advancement to candidacy. Furthermore, the Prospectus will provide information that may be discussed during the oral exam. The Prospectus must be submitted to the QE Committee at least ten working days prior to the date of the Oral Exam. More details are provided in the ASGG Prospectus Guidelines document available on the ASGG website.

iii) Oral Portion of the Exam

The oral portion of the qualifying exam will be 2-3 hours in length and is intended to demonstrate the student's critical thinking ability, powers of imagination and synthesis, and broad knowledge of the field of study. The committee will evaluate the student's general qualifications - as well as the student's preparation in a special area of study - based upon relevant portions of the student's previous academic record, performance on specific parts of the examination, and the student's potential for scholarly research as indicated during the examination.

The oral portion of the QE is administered by the student's QE Committee and is open to all ASGG faculty only with the unanimous consent of the committee and student. The oral portion of the QE will include two parts. The first part is a student presentation of the prospectus, which should be prepared as an approximately 20–30 minute talk. The actual presentation will take significantly longer because of questions from the Committee. The second part of the exam will be oral questions by the Committee and interested faculty (if present) regarding the student's prospectus, general knowledge of Atmospheric Sciences, and depth area of study.

iv) Outcome of the Exam

The QE Committee shall evaluate the Qualifying Exam based upon the following expectations for the student: (i) a clear, well-written Prospectus that includes background information and the significance of the research area, clearly stated research goals, methods for addressing these goals, and any preliminary results, (ii) a clear presentation that covers these same points, (iii) a mastery of the material related to the prospectus as well as material from core and elective coursework and general Atmospheric Sciences, and (iv) the ability to answer questions to the satisfaction of the committee members. Only the appointed members of the QE Committee will be present for the exam deliberation and evaluation. Successful completion of both portions of the QE, followed by filing the application for "Advancement to Candidacy" with Graduate Studies and approval of the application, promotes the student to candidate for the Doctor of Philosophy degree.

The committee will reach a decision on the student's performance immediately after the oral exam. The QE Report must be submitted to Graduate Studies within 3 business days of the exam. The committee, having reached a unanimous decision, will inform the student of the exam outcome:

- "Pass" (no conditions may be appended to this decision)
- "Retake" (only possible on the first attempt of the QE; the QE Report must specify whether the student is required to retake all or part of the examination, list any additional requirements, and state the exact timeline for completion of requirements to achieve a "Pass")
- "Fail"

If the committee is unable to reach a unanimous decision, the QE Report must explain the opinions of the majority and minority of the committee. The committee must inform the student of the non-unanimous outcome and the majority and minority opinions of the committee. The student may also provide a statement for consideration by the Graduate Council Administrative Committee (GCAC). See the "Non-unanimous Committee Decisions" section in the Graduate Council Doctoral Qualifying Examinations Policy (GC2005-02) for more details.

If a unanimous decision takes the form of "Retake" or "Fail," the Chair of the QE committee must include in the QE report a statement, agreed to by all members of the committee, explaining their decision. If a student receives a "Retake," they may attempt the QE one additional time. In such cases, the QE report must be provided to the student in writing, setting out clear expectations, specific conditions, and an approximate timeline for completion of additional requirements. The QE chair will meet with the student approximately one week following the first attempt to discuss the expectations for the second exam.

After a second examination, the only outcomes possible are "Pass" or "Fail." Only one retake of the qualifying examination is allowed. If the student receives a "Fail" on the first or second attempt at the exam, the student will be recommended for

disqualification from the program to the Dean of Graduate Studies (see Graduate Studies Disqualification and Appeal Policy).

A student who passes the QE and decides to change to a Plan II MS degree can waive the MS exam requirement. Other requirements (units, sufficient demonstration of subject proficiency, etc.) of the MS exam plan still apply.
[*NOTE: The Qualifying Exam is considered equivalent to the MS Comprehensive Exam for doctoral students. Doctoral students who have passed the Qualifying Exam may petition for an MS degree so long as they meet other campus and ASGG eligibility criteria*.]

c) Dissertation

i) Dissertation Defense

The dissertation follows Plan A with a required public exit seminar and a closed dissertation defense. Both components must be completed before the dissertation will be signed.

a) **Exit Seminar.** This is a formal seminar open to students, faculty and the public. Satisfaction of this requirement must be verified by the Dissertation Committee Chair. The Dissertation Committee will not sign the Dissertation until after the exit seminar has taken place. Scheduling and advertising of the exit seminar is the responsibility of the student.

b) **Oral Examination.** This is a closed-door exam that is administered and evaluated by the five members of the Dissertation Committee. One member of the committee can participate remotely, but we encourage all members to participate in person. The oral examination will focus on the dissertation and the relationship of the candidate's research to the overall discipline and should not exceed three hours. If the committee deems the candidate to have failed the oral examination, the candidate will be provided detailed written feedback regarding the reason for the not pass and what steps need to be taken to have satisfactory performance. The ASGG Graduate Advisor will also be provided a copy of the feedback and steps. The candidate will be given an opportunity for re-examination at a later date, typically no more than 3 months after the initial attempt. If the committee determines that the candidate's performance on the second exam remains unsatisfactory, the committee will communicate this information to the ASGG Graduate Advisor, who will recommend to the Dean of Graduate Studies that the candidate be disqualified from the program.

ii) Dissertation: General Requirements

Filing the dissertation with Graduate Studies is the last requirement for the Ph.D. The deadlines for completing this requirement are listed each quarter on the Graduate Studies website: https://grad.ucdavis.edu/. A candidate must be a registered student or in Filing Fee status at the time of filing a dissertation, except for the summer period

between the end of the Spring Quarter and the beginning of Fall Quarter. The dissertation will be prepared, submitted and filed according to regulations instituted by Graduate Studies: https://grad.ucdavis.edu/. Satisfaction of this requirement must be verified by the Dissertation Committee Chair.

iii) Dissertation

The Ph.D. dissertation must be an original and substantial contribution to knowledge in the student's major field. It must demonstrate the ability to carry out a program of advanced research, relying extensively upon one's own initiative and skills, and must report the results in accordance with standards observed in recognized scientific journals. The dissertation must be written in accordance with the rules issued by Graduate Studies and must be approved (i.e., signed) by the three Reading Members of the five-member Dissertation Committee. The chair of the dissertation committee must be a member of the program and must be immediately involved with the planning and execution of the experimental work done to formulate the dissertation. The Major Professor's laboratory is the setting for most of the student's research activities, unless an alternative site and immediate supervisor are approved in advance by the Executive Committee.

Students should meet regularly with their dissertation committee. The dissertation must be submitted to each member of the dissertation committee at least one month before the student expects to make requested revisions; committee members are expected to respond within 4 weeks, not including summer months for nine-month faculty. Informing committee members of progress as writing proceeds helps the members to plan to read the dissertation and provide feedback within this time frame.

The Major Professor or Graduate Advisor should intervene in cases where faculty are not meeting the required timeline. The dissertation must be approved and signed by the dissertation committee before it is submitted to Graduate Studies for final approval. Should the student fall short of making satisfactory progress on the dissertation at any point in time, the Major Professor or the Graduate Advisor should submit an annual assessment, or one or more interim assessments, to Graduate Studies that describes the marginal or unsatisfactory assessment of the student's progress. Should the committee determine at any point that the student's progress is unacceptable for continuation in the program, even with substantial revisions to the work, the program may recommend to the Dean of Graduate Studies that the student be disqualified from the program.

10) Normative Time to Degree

Normative time to degree is 18 quarters with 8 quarters being Normative Time to Advancement to Candidacy and 10 quarters being Normative Time in Candidacy.

11) Typical Timeline and Sequence of Events

Note: Students must be enrolled in a minimum of 12 units (including 290 and 299) each academic quarter.

Year 1	**Fall**	**Winter**	**Spring**
	ATM 120 (4 units)	ATM 121A (4 units)	ATM 158 (4 units)
	ATM 245 (4 units)	ATM 160 (4 units)	200 level course (4 units)
	ATM 290 (1 unit)	ATM 299 (4 units)	ATM 290 (1 unit)
	ATM 299 (3 units)		ATM 299 (3 units)
TOTAL	12 units	12 units	12 units
Year 2	**Fall**	**Winter**	**Spring**
	200 level course (4 units)	200 level course (4 units)	200 level course (4 units)
	ATM 290 (1 unit)	ATM 299 (8 units)	ATM 290 (1 unit)
	ATM 299 (7 units)		ATM 299 (3 units)
TOTAL	12 units	12 units	12 units
Year 3	**Fall**	**Winter** (Advancement to candidacy)	**Spring**
	200 level course (4 units)	ATM 299 (12 units)	ATM 299 (12 units)
		Qualifying Exam	
	ATM 299 (8 units)		
TOTAL	12 units	12 units	12 units
Years 4 - 6	Dissertation Research, Write and Revise Dissertation, Exit Seminar, Dissertation Defense		

Students with significant deficiencies in prerequisite coursework upon enrollment in the program will take longer to complete their degrees.

12) Sources of Funding

Students may be funded through a combination of fellowships, graduate student researcher positions, and teaching assistant appointments.

13) PELP, In Absentia, and Filing Fee Status

Information about PELP (Planned Educational Leave Program), In Absentia (reduced fees when researching out of state), and Filing Fee status can be found in the Graduate Student Guide: https://grad.ucdavis.edu/.

14) Academic Accommodations

Students requiring academic accommodations to complete degree requirements must register with the Student Disability Center (SDC) and initiate the interactive accommodation process. Academic accommodations cannot be granted retroactively, and it is the student's responsibility to follow the appropriate process for requesting accommodations in advance of needing them to complete a degree requirement (e.g., coursework, comprehensive exam,

etc.).

15) Leaving the Program Prior to Completion of the Ph.D. Requirements

If a student leaves the program prior to completing the requirements for the Ph.D., they may still be eligible to receive a master's degree if they have fulfilled all the requirements (see Master's Degree Requirements above). Students must submit a Change of Degree Objective form.

16) Co-Authorship Policy from Graduate Council

In accordance with Graduate Council Policy, MS theses and Ph.D. dissertations can include material that is wholly or in part co-authored and/or collaborative. The thesis/dissertation committee will certify that the student's contributions to these works are sufficient and the equivalent of a single-authored thesis or dissertation chapter. The contributions of the student should be clearly indicated within the thesis and dissertation in the acknowledgements or the introduction. Published, accepted, in-preparation, or other works included in the thesis/dissertation are governed by this policy. Faculty in the ASGG may not require prior publication, submission, or presentation in refereed venues as a requirement for the MS or Ph.D. degree, but they may require these for conditions of employment.