ATMOSPHERIC SCIENCE

COLORADO STATE UNIVERSITY

Graduate Student Handbook

Updated December 2025

I. INTRODUCTION

The Department of Atmospheric Science was established in the Walter Scott, Jr. College of Engineering at Colorado State University in 1962 and the Ph.D. degree program authorized in 1963. The department now has alum throughout the world on various career paths. Located on the CSU Foothills Campus, the department is also home to the Colorado Climate Center.

The department is currently engaged in innovative research across a broad spectrum of atmospheric sciences. The sponsors of these research projects include the National Science Foundation, National Oceanic and Atmospheric Administration, National Aeronautics and Space Administration, Office of Naval Research, State of Colorado, Department of Interior, Department of Defense, Department of Health and Human Services, Department of Transportation, Department of Energy, and the Environmental Protection Agency.

Through research to develop and strengthen programs of accessibility, excellence in earth science education is also firmly supported by the department. Research focuses broadly on mentoring all scientists, broadening participation via formal and informal learning settings, and developing leaders that are better prepared to address access and success challenges in the earth and environmental sciences.

Included among the research faculty participating in ongoing department research programs are individuals recognized internationally as authorities in the following fields:

Aerosol Science
Air Quality
Atmospheric Chemistry
Atmospheric Radiation
Atmospheric Transport Processes
Causal Discovery
Climate Change
Climate Dynamics
Climate Futures and Sustainability
Climate and Societal Dynamics
Cloud Dynamics
Cloud and Precipitation Physics
Cumulus Convection and Cloud Dynamics
Data Assimilation
General Circulation Modeling
Global Scale Circulations
Global and Regional Climatology
Machine Learning
Mesoscale Meteorology
Mesoscale Modeling
Physical Oceanography
Radar Meteorology
Radiation Theory
Remote Sensing
Satellite Meteorology
Theoretical and Dynamic Meteorology
Tropical Meteorology and Tropical Cyclones

This manual has been prepared to acquaint you with the policies and regulations that govern the graduate degrees in the Department of Atmospheric Science. This document should be read in conjunction with the current Graduate and Professional Bulletin of Colorado State University. It has been written to emphasize certain information contained in the Bulletin and to outline specific department policies and procedures. These

requirements supplement, but do not supersede, all statements in the Graduate and Professional Bulletin.

Additional Graduate School resources include:

- The Graduate School Handbook
- A quick-reference timeline toward your degree
- All Graduate School forms and applications for enrolled students
- All Graduate School deadlines and important dates

II. PROGRAMS OVERVIEW

The department offers Master of Science and Doctor of Philosophy degree programs. Students typically complete the M.S. program within 24-30 months of enrolling in the program. The Ph.D. generally requires a minimum of 48 months beyond the M.S. degree. The department does not offer a bachelor's program, but does have several undergraduate courses.

A. The Master of Science Degree

https://catalog.colostate.edu/general-catalog/colleges/engineering/atmospheric-science/atmospheric-science-ms-plan-a/

The M.S. program trains the next generation of scientists in atmospheric science, a critical field for understanding weather and climate issues that significantly impact all life on Earth. Graduates acquire the knowledge and skills necessary to pursue a Ph.D. or to enter diverse careers, including weather and climate forecasting, insurance, government laboratories, NGOs, and environmental consulting.

Students gain this expertise through a core curriculum, a selection of elective graduate courses, and hands-on scientific research with their advisors. M.S. with Thesis (Plan A) students are required to complete a master's thesis based on their research. The work is expected to be of publication quality.

Although the department does have a M.S. non-thesis (Plan B) program, students are not admitted directly to that program.

B. Doctor of Philosophy Degree

https://catalog.colostate.edu/general-catalog/colleges/engineering/atmospheric-science/atmospheric-science-phd/

The Ph.D. program trains the next generation of scientists in atmospheric science, a critical field for understanding weather and climate issues that significantly impact all life on Earth. Graduates acquire the knowledge and skills necessary to pursue an academic career or to enter diverse careers, including weather and climate forecasting, insurance, government laboratories, NGOs, and environmental consulting. Under the tutelage of renowned atmospheric science faculty, Ph.D. students dig deep into the discipline, produce important contributions, and drive future advancements through original research. Going a step further than the master's program, Ph.D. students will create fundamentally new content that adds to the body of knowledge in their field.

A means for acquiring the breadth and depth of knowledge expected of Ph.D. candidates is provided by the large selection of course offerings from which students, with their advisor's assistance, may structure a program of study that best serves research goals.

III. ADMISSIONS REQUIREMENTS AND PROCESS

A. Admissions Requirements

1. Master of Science

- Bachelor's degree in physics, math, atmospheric science, engineering, chemistry or related field with a cumulative GPA of at least 3.0
- Calculus-based math course sequence including differential equations and vector analysis
- Calculus-based physics course sequence including kinetics, electricity and magnetism, and some modern topics

Depending on their chosen area of specialization in atmospheric science, students may find coursework in one or more of the following areas helpful: fluid mechanics, statistical thermodynamics, kinetic theory, modern physics, physical and/or analytical chemistry, statistics, applied math and numerical analysis.

The department does not have a direct-to-Ph.D. program. If you have not earned an M.S. degree, you must apply for the M.S. program.

2. Doctor of Philosophy

- Successful completion of an M.S. degree with thesis* in atmospheric science or related field with a cumulative GPA of at least 3.0
- Demonstration of basic principles of atmospheric science and aptitude for research

*Published scientific papers in recognized professional journals may be submitted in lieu of a thesis.

B. Admission Process

Applicants must complete an application to the Graduate School at CSU.

For full consideration, application deadlines are January 1 for fall admission and September 1 for spring admission.

1. Required documents (uploaded in application):
   - Statement of purpose (200-500 words) addressing a subset of the following questions:
     - Why do you want to attend graduate school at CSU, and in general?
     - What are your research interests for graduate school?

    - Discuss a specific science question in atmospheric science or another field that intrigues you. Why does it interest you? How might we go about solving it?
    - What other information would you like us to consider in support of your graduate school application?
- Curriculum vitae/resume
- At least three letters of recommendation
- Transcripts (see below for additional information)
- **The department does not require or consider GRE scores**

2. Required supplemental question (answered in application):
    - Have you applied for or received outside funding (e.g. AMS, government, or other fellowships)?

3. Application fee
    - Applicants are responsible for the application fee. The department cannot provide application fee waivers at this time
    - The Graduate School provides some opportunities to apply for free. Refer to their Ways to apply for free website for more information. Fee waivers based only on financial need are not considered

4. Transcripts from all college institutions
    - The department accepts unofficial copies of transcripts for admission review. Applicants can upload those copies to their application
    - Admitted students must submit official transcripts from all universities/colleges attended before the end of their first semester at CSU. Failure to do so may result in expulsion from the graduate program

5. International students:
    - International students must also submit proof of English proficiency
    - The department follows CSU Graduate School's requirements. Please visit the Graduate School's English proficiency website for specific information on what tests are accepted, required minimum scores, and how to submit scores

IV. STANDARDS AND GENERAL PROCEDURES

A. Scholastic Standards

By Graduate School regulations, students must maintain a cumulative GPA of at least a 3.0 and maintain satisfactory progress within their department.

A minimum cumulative grade point average (GPA) of 3.0 is required and consists of the following categories:

1. Overall course GPA, which is calculated from all regular and non-regular courses graded traditionally (A-F). Regular courses are those other than independent or group studies, research courses, open seminars, thesis/dissertation credits, study abroad, U.S. travel, supervised college teaching, student teaching, practicum, internship, field placement, unique title courses offered through Continuing Education (CSU Online), and any courses graded pass/ fail, and
2. Regular course GPA, which is calculated from all regular courses traded traditionally, and
3. Program of Study overall GPA, or the GPA calculated from all traditionally graded regular and non-regular courses listed on the approved graduate program of study (see the GS6 Program of Study section), and
4. Program of Study regular GPA, defined as the GPA calculated from all traditionally graded regular courses listed on the approved program of study

Should a student fail to maintain a cumulative GPA of 3.000, they will be placed on an Academic Dismissal Warning period for one semester beyond the one in which the status is acquired. Students who are graduate research assistants will lose their appointment. During the Academic Dismissal Warning period, the student must enroll in traditionally graded courses that affect the grade point average. With permission of the student's graduate committee, the student may register for continuous registration instead; this may be used to extend the Academic Dismissal Warning period for a maximum of two semesters. If a student is unable to improve their cumulative GPA, they are subject to dismissal by the department or the Dean of the Graduate School.

Students not making satisfactory progress are encouraged to discuss these issues with their advisor.

B. Academic Honesty

Students are expected to adhere to a high standard of ethics and conduct during their graduate program of study and in their professional careers beyond. Academic dishonesty will not be tolerated. Students guilty of academic dishonesty may be subject to immediate

dismissal or appropriate lesser penalty. Academic dishonesty includes, but is not limited to, such acts as cheating, plagiarism, and falsification of data or documents.

For a complete discussion of procedures related to academic dishonesty, please refer to the Graduate and Professional Bulletin.

C. Health Insurance Requirement

All domestic and international students taking six (6) or more residential instruction credits are required to carry health insurance. Students must meet this requirement in their first semester at CSU and every fall semester thereafter.

Students can submit coverage through a private health insurance plan or enroll in the University-sponsored Student Health Insurance Plan. Once they are notified to do so, students should enroll or opt out as soon as possible to ensure coverage. International students will be automatically enrolled. Please see the CSU Health Network website for more detailed information on plans.

The Graduate School provides a health insurance contribution for those students who are graduate research assistants enrolled in a minimum of five (5) residential instruction credits. **GRAs must enroll in CSU's Student Health Insurance Plan instead of being automatically enrolled.**

D. Transfer Credits

For both the masters' and doctoral programs, a maximum of six (6) credits may be transferred from another institution with the student's graduate committee's approval.

In addition, courses requested for transfer:

- Must have been completed at a university that is accredited by one of the major regional accrediting agencies
- Must have a grade of B or better
- Must be at the equivalent level of CSU's regular courses at the 500-level or above
- Cannot have been used to fulfill requirements for a previously earned degree
- Must be equivalent to semester credit hours

For students requesting to transfer credits from a foreign institution, the following information must also be submitted:

- The CSU course equivalency to the transfer course(s) and how the adviser or department head came to that conclusion
- An explanation on how the advisor or department head is familiar with the course(s) being request for transfer

E. Residency Requirements

Students must register for each term they use University facilities including advising or adviser help with thesis preparation. Following admission to the Ph.D. degree program, the student must be on campus at CSU for at least two semesters. It will be the responsibility of the academic department head to certify the candidate's completion of the on-campus credit requirements.

F. Course Load

All students on an assistantship must register for 15 credits each semester.
Graduate teaching assistants who are also research assistants are required to register for at least one (1) credit of ATS 784 Supervised College Teaching during the semester in which so appointed. This is included in the total 15 credits.

Fellowship holders should register for 15 credits unless otherwise instructed by their research project manager or the graduate adviser.

The maximum credit load for all graduate students is 15 semester credits. Overloads must be approved by the dean of the Graduate School.

G. Continuous Enrollment for Graduate Students

All graduate students at CSU are required to be continuously enrolled in their degree programs. In the department, all domestic and international students on a Graduate Research Assistantship must enroll for 15 credits each fall and spring semester. This total may consist of both structured courses and thesis/dissertation credits (ATS 699/799.) Tuition costs for students on a GRA are typically borne by a research project. Students continuing into the fall semester are not required to register during the summer session. See below for more information on summer graduation requirements.

Prior to the final semester of a student's program, a student's adviser may petition the department to reduce the student credit load. Such petitions should be received at least two (2) weeks prior to the start of the semester and normally will be approved for one semester only. Students (through their advisers) can request approval for registration at either the one (1)-credit level or six (6)-credit level. Students are encouraged to consult with their adviser and department staff about the advantages and disadvantages of these options.

Enrollment requirements for part-time, non-resident, or non-GRA students should be discussed with the department.

If graduating in the summer, a student must register for either a course or for Continuous Registration. Most students in the department register for CR in this case; for those that are GRAs, this will not preclude their appointment. CR serves as an enrolment placeholder, and a CR fee is assessed rather than the regular tuition charge. In addition, only the University technology student fee will be assessed. Registration for CR status is accomplished the same way as regular courses through RAMweb.

Graduate School stipulates that a student may register for CR for the following reasons:

- You do not require the use of University resources outside of library and campus computing services, but are actively working on your degree requirements. If you are utilizing CSU facilities to conduct your research, you must not enroll in CR; instead, enroll in the appropriate number of research, thesis or dissertation credits
- You will not be working on your degree requirements, but will be leaving the University for professional or personal reasons (e.g., mission service, medical or parental leave, work) or an official assignment for CSU

Students in their 1st, 4th, or 8th semester of CR are required to submit a Student Plan for Degree Completion to their advisers and the department. Students are limited to a maximum of 10 semesters of CR. A Graduate Degree Progress Hold preventing registration will be placed on their record when 10 semesters of CR are exceeded. A student's adviser may petition this hold following the Graduate School's General Petition Instructions. The Graduate School's website has additional information on CR requirements.

CSU health insurance when registering for CR:

- Domestic students are not required to enroll in CSU's Student Health Insurance Plan but are still eligible to enroll
- International students are still required to be enrolled in or waive SHIP

H. Outside Employment

A full-time graduate student in the Department of Atmospheric Science is expected to direct their full professional energies to the successful and timely completion of the M.S. or Ph.D. program. In accordance with this expectation, outside employment is discouraged for atmospheric science graduate students on GRA appointments. If extenuating circumstances require that a student have outside employment, the department head and adviser must be notified and concur prior to such employment.

I. Graduate Committees

A graduate committee will supervise each student's educational program and research activities. Advisers will be appointed prior to the first registration. The associate department head serves as interim adviser to those students who do not yet have an appointed adviser. The graduate committee, selected by the student in consultation with their adviser, must be appointed before the fourth regular semester registration.

Inasmuch as all graduate student research is degree oriented, the adviser of a student appointed as a graduate research assistant will normally be the principal investigator of the project(s) under which they are supported. The adviser of an independently supported student normally will be the faculty member whose areas of expertise are most nearly related to the field in which the student desires to specialize. Hence, independent students should take the initiative in discussing adviser possibilities with the associate department head and in contacting faculty members regarding service as their adviser. In the event that the faculty member preferred by a student should already have too many advisees, the department head may appoint another member of the faculty as adviser.

Each student is required to assemble their graduate committee at least once per year during the Ph.D. to review progress toward their degree (see Section V.B.2).

The student is expected to take the initiative discussing prospective committee membership with their adviser and in contacting those faculty members with respect to their availability for service on their graduate committee.

To officially appoint their committee, students must submit a GS6 Program of Study form to the Graduate School (see the next section of this handbook for more information on the Program of Study.) If committee changes are required once the Program of Study has been approved, those are recorded through the filing of a GS9A Petition for Committee Member Changes form with the Graduate School.

1. Master's Degree Committee Requirements

- The adviser who serves as chairperson of the committee
- At least one additional Atmospheric Science (ATS) academic faculty member
- ATS-appointed affiliate faculty members may serve on the committee, but not replace, an ATS academic faculty member
- One member from an outside department

2. Doctor of Philosophy Degree Committee Requirements

- The adviser who serves as chairperson of the committee
- At least two additional ATS academic faculty members
- ATS appointed affiliate faculty members may serve on the committee, but not replace, an ATS academic faculty member
- One member from an outside department

3. Affiliate Faculty and Special Committee Members

Affiliate faculty members are non-CSU employees who have been approved by department faculty and the University to serve as official voting committee members.

ATS staff who are not faculty members also may serve on the committee and vote if they are given a special appointment. Individuals who are not academic faculty and do not have an affiliate or special faculty appointment but who have special expertise may serve on committees in addition to the prescribed members, but may not vote regarding examination results.

J. Program of Study Form

Both Masters and Doctorate students must prepare a Program of Study using a GS6 Program of Study form should be signed and submitted on RAMweb as soon as the graduate committee has been established. M.S. students must submit this form before the fourth regular semester. Ph.D. students must submit this form before the fourth regular semester registration or the preliminary exam, whichever comes first.

The following regulations are governed by the University and are required of all graduate students.

Graduate credit is not granted for completion of courses numbered at the 100 and 200 level. Graduate students may take such courses for general enlightenment or to satisfy a background requirement as specified on the program of study. Grades earned in such courses will not be considered in computing the graduate grade point average described in the "Quality of Work" section of the catalog. Students may also take 300 and 400 level courses as part of their degree program. These classes will NOT replace any ATS required class.

A student who wants to attend a class but does not wish to earn credits may register as an auditor. Auditing a course requires prior approval from the student's adviser and the instructor of the course. When computing course loads and assessing fees, audited courses are counted the same as if taken for credit. Audited classes do not count toward total credit requirements recognized by Graduate School in order to earn a degree. Required courses listed on the program of study may not be taken on a "Student Option, Pass Fail" basis. Courses which are offered "Pass Fail only" or "Instructor Option, Pass Fail" are acceptable. Background courses may be taken "Student Option, Pass Fail" in accordance with the provision of the following paragraph.

Courses taken by a graduate student on a pass-fail basis are subject to the limitations imposed by the student's committee and the department with regard to acceptability for meeting degree requirements. Registration for pass fail should be approved by the advisor

prior to enrollment. Choice of audit status and pass fail must be made during the registration or schedule change period.

K. Academic Appeals Process

Appeals of academic decisions made at the departmental level will include but are not limited to decisions on grades and other academic aspects of a course or academic program involving evaluation of a student. Academic decisions are not themselves disciplinary and are not to be confused with decisions on academic dishonesty or other kinds of misbehavior that may affect courses or programs. Appellate procedures of academic decisions should make clear that they do not apply to other types of procedures.

Appeals must be initiated no later than the end of the next regular academic term (either fall or spring semester) following the academic decision being appealed. Before making an appeal, the student should discuss the situation with the faculty member(s) involved in the decision.

In appeals of academic decisions, the burden of proof lies with the student. The student must demonstrate that the decision was one of the following:

1. A decision based on some basis other than performance
2. A decision based on unreasonable standards different from those which were applied to other students
3. A decision by a substantial, unreasonable, and unannounced departure from previously articulated standards

Only parties directly involved in the dispute or called to provide information may be present during the hearings.

If discussion with the faculty member(s) fails to resolve the situation, the student will have access to the steps that follow:

1. The student may submit a statement in writing to the department head setting out the basis for the appeal with appropriate documentation. The department head will respond in writing to all parties within a reasonable time as stipulated in the department code. If the department head's response is unacceptable to the faculty member(s) or the student, either party may then appeal (in writing) to a departmental appeals committee, setting out the basis for the appeal
2. The department appeals committee shall consist of two academic faculty members and two graduate students from the Department of Atmospheric Science: (a) the associate department head, (b) one other faculty member appointed by the department head, (c) one M.S. student representative appointed by the department

head, and (d) one Ph.D. student representative appointed by the department head. In the event that any of the members of the committee are parties to the appeal, the department head would appoint an appropriate alternate

3. Any appeal of the committee's findings will be made in writing to the dean of that department's college wherein the student or faculty member(s) will stipulate the basis for the appeal. The academic dean should hear the case within a reasonable time, and the Dean's decision is to be communicated in writing to all parties
4. Any appeal of the dean's findings will be made in writing to the provost/academic vice president setting out the basis for the appeal. The provost/academic vice president should make a determination within a reasonable time. The decision of the provost/academic vice president will be final
5. In the event that parties to the appeal are absent from campus, additional time may be given for the appeal

Remedies, if any, for the appeal will be stipulated in writing by the deciding party at each step. Such remedies may include but are not limited to:

1. Change of grade
2. Directing the instructor(s) to administer a new examination or term paper

Brief records of the hearing and decisions at each level will be kept. These records will be forwarded to the next step in the appeal process if the appeal continues. Hearings and findings are confidential.

L. Student Representative/Participation

Each year three M.S. student representatives and three Ph.D. student representatives are elected by the graduate students of the department. The student representatives meet with the associate department head and provide input at faculty meetings that is considered in department policy decisions.

Students are encouraged to voice their opinions on current topics in meetings of the student body. Student representatives then bring these matters to the attention of the faculty.

Representation on the Graduate Student Council is also an important form of representation.

Weekly colloquia keep students informed of current research activities and provide opportunities to present their own work.

M. Examinations

1. Voting Members

Individuals who are not academic faculty but who have special expertise may serve on committees in addition to the prescribed members, but may not vote at the examination unless special approval is granted.

Voting at all examinations shall be limited to the members of the student's committee, and a majority vote is necessary to pass the examination. A tie vote is interpreted as failure to pass the examination. All members of the committee must sign the examination form.

2. Conduct of Examinations

All committee members must be either present at an examination, must be represented by a replacement who has been approved in advance by Graduate School, or can participate in real time virtually. The result form is still due to Graduate School within two working days.

Examinations cannot be suspended after having begun. Once begun, unsatisfactory performance must be documented as a failure, that is, an examination cannot be postponed to give a candidate another chance at a later time.

3. Due Date

The student is responsible for initiating the GS 24 Final Exam Results form on RAMweb, which must be electronically signed by all committee members and adviser within two working days after exam results are known.

4. Relationships of Final Examinations and Papers/Theses/Dissertations

The final examination is a unique entity and, while it is traditional to base the examination on the content of the thesis or dissertation, passage of the examination and approval of any required professional paper, thesis, or dissertation are separate items and should be dealt with as such. Thus, a student may be passed on a final examination without giving final approval to the submitted thesis, dissertation, or paper. In fact, a student can pass the final examination and not receive a degree if the professional paper, thesis, or dissertation does not meet minimum standards and is not approved. In this regard, it is important to check the appropriate box on the GS25 Application for Graduation form stating that the appropriate document is a requirement of graduation.

The report of the final examination is still required within two working days after the results are determined, and this is NOT dependent on approval of papers, theses, and dissertations.

5. Re-Examinations

Providing the committee approves a candidate who fails the final or preliminary examination may be re-examined once and, for the re-examination, may be required to complete further work. The re-examination must be held no later than six months after the first examination. The re-examination may not be held earlier than two months after the first examination unless the student agrees to a shorter time period. Failure to pass the second examination results in dismissal from the Graduate School.

6. Examinations Open to Public

Both thesis and dissertation defenses are open to all members of the University community and the public at large.

7. Program-specific Examinations

Please refer to the M.S. examinations section and the Ph.D. examinations section for program-specific details.

V. MASTER OF SCIENCE PROGRAM

A. Minimum Credit Requirements

In addition to meeting the formal credit requirements for the M.S. described below, all graduate students enrolled in the department are expected to attend the weekly department colloquium series. These colloquia are an important part of the total instructional program.

1. Plan A (Thesis)

A minimum of 30 semester credits plus thesis is required. At least 19 credits must be earned in structured academic courses. * 11 credits may be in special studies, graduate seminars, and research. Of the total 30 credits, 20 must be Department of Atmospheric Science courses (i.e., courses with the ATS prefix).

*A structured class includes classroom instruction. All classes taught in the Department of Atmospheric Science are defined as structured except the following: ATS 695, ATS 699A-V, ATS 784, ATS 795, and ATS 799A-V.

All M.S. students must complete the following required courses (required courses account for 13 credit hours):

601 Atmospheric Dynamics I (2 credits)
606 Introduction to Climate (2 credits)
620 Thermodynamics and Cloud Physics (2 credits)
621 Atmospheric Chemistry (2 credits)
622 Atmospheric Radiation (2 credits)
693 Responsible Research in Atmospheric Science (1 credit)

One of the following:
640 Introduction to Synoptic Dynamics (2 credits)
641 Introduction to Mesoscale Dynamics (2 credits)

All M.S. students also must complete 6 elective credit hours in structured classes. Electives may include any structured class at the 500/600 level. With written instructor and adviser approval, electives also may include structured 700 level classes and/or structured graduate courses in other departments. The written approval should be in the form of an email to the graduate adviser.

Audits do not count toward the M.S. degree.

A student may substitute a required class for an alternative course if:

- Course similar to the required class already has been completed at the graduate level with a grade of B or higher
- The student's adviser, the department head, and the instructor of the required course approve the substitution in writing

2. Plan B (Non-thesis)

The student must complete a minimum of 30 semester credits. The 30 credit hours must include:

a. The 13 required credit hours listed in the Plan A (Thesis) (including ATS 693)
b. A minimum of 11 elective credit hours in structured classes. Electives may include any structured class at the 500/600 level. With written instructor and advisor approval, electives also may include structured 700 level classes and/or structured graduate courses in other departments. The written approval should be in the form of an email to the graduate advisor.
c. The remaining six credit hours may be in independent studies (695). Research credits (699, 799) and audits do not count toward the non-thesis M.S. degree.

Of the total 30 credits, 20 must be Department of Atmospheric Science courses (i.e., courses with the ATS prefix). A scholarly paper, as defined by the graduate committee, must be prepared and presented to the committee. This paper and presentation comprise the final examination.

3. National Weather Service Basic Requirements

For those students interested in employment as an operational meteorologist with the National Weather Service, adherence to basic education requirements is important. Education requirements for a meteorologist (GS 1340 series) include the following:

a. At least 24 semester (36 quarter) credits in meteorology/atmospheric science including a minimum of:
    i. 6 semester credits of atmospheric dynamics and thermodynamics (from ATS 601, 602, 604, 620, and 623, as well as appropriate 700-level courses)
    ii. 6 semester credits of analysis and prediction of weather systems (synoptic/mesoscale) (from ATS 640, 541, 605, and 655, as well as appropriate 700-level courses)
    iii. 3 semester credits of physical meteorology (from ATS 606, 621, and 622, as well as appropriate 700-level courses)
    iv. 2 semester credits of remote sensing of the atmosphere and/or instrumentation (from ATS 650 and 652, as well as appropriate 700-level courses)

b. 6 semester credits of physics, with at least one course that includes laboratory sessions
c. 3 semester credits of ordinary differential equations
d. At least 9 semester credits of course work appropriate for a physical science major in any combination of three or more of the following: physical hydrology, statistics, chemistry, physical climatology, radiative transfer, aeronomy, advanced thermodynamics, advanced electricity and magnetism, light and optics, and computer science.

There is a prerequisite or co-requisite of calculus for course work in atmospheric dynamics and thermodynamics, physics, and differential equations. Calculus courses must be appropriate for a physical science major.

B. Examinations

An M.S. student is expected to demonstrate a breadth of knowledge in the fundamentals of atmospheric science. Students will be examined on their core program specifically in atmospheric dynamics, atmospheric physics and chemistry, atmospheric circulation systems, and atmospheric measurements.

1. Plan A (Thesis)

An oral examination, consisting of a seminar and a question session by the student's committee is conducted. The exam outcome is reported to Graduate School within 2 working days via the GS24 Final Exam Results form.

2. Plan B (Non-thesis)

The student is required to submit a brief research paper in AMS format. The student's committee decides on a topic. An examination also is given covering the student's course program. The exam outcome is reported to Graduate School within 2 working days via the GS24 Final Exam Results form.

If a department chooses to administer a single common examination to its Plan B master's candidates, a departmental examining committee may serve this function. Plans and arrangements for a common final examination for Plan B candidates must be on file with Graduate School in advance of the examination date. Questions relating to this option should be directed to Graduate School.

C. Thesis Requirements

Unless specifically authorized by their adviser/supervisor, students are expected to make independent arrangements for drafting their theses and must adhere to the format

specified in the Graduate School Thesis Manual. The department assumes no responsibility for the mechanics of thesis preparation.

Students enrolled in the Plan A (Thesis) program but submit a complete, typed final draft of their thesis to their committee at least four weeks before the final examination.

D. Continuing onto the Doctoral Program

Current ATS students may internally apply to the Ph.D. program at any time after the M.S. defense. A student cannot advance to the Ph.D. I level until this application process has been completed.

Application materials for current ATS include:

- A nomination letter, written by the proposed Ph.D. adviser, indicating that the faculty member agrees to advise the student and indicates the means of financial support
- A statement of research interests / goals prepared by the student
- The student's official academic record (M.S. coursework, breadth and grades; standardized test results, as applicable)
- A recommendation by the student's M.S. committee, which evaluates the M.S. thesis, defense (presentation skills), and perceived research aptitude. This recommendation is normally in the form of a memo to the department, submitted after the defense
- A statement indicating the expected completion date of the preliminary exam, including a rationale for deviating, if necessary, from the 12-month guideline established for continuing graduate students

Each application is screened by the department head, the associate department head, and a representative from the Departmental Graduate Committee (DGC). The Ph.D. advisor cannot be the DGC representative. This group comes to a consensus decision whether the applicant will be admitted to the Ph.D. program. The DGC representative documents this decision with a brief memo, to be placed in the student's file.

Upon admission, if the student is a graduate research assistant, their status becomes that of Ph.D. I.

E. Summary of Procedures

Please see Appendix A Master of Science Summary of Procedures.

VI. DOCTOR OF PHILOSOPHY DEGREE

The Doctor of Philosophy degree is the highest academic degree offered by CSU. Those who earn the Ph.D. must demonstrate significant intellectual achievement, high scholarly ability, and great breadth of knowledge. A more specific listing of the departmental expectations of each successful Ph.D. candidate is given below.

1. A demonstrated breadth of knowledge and command of basic principles underlying the field of atmospheric science together with a demonstrated aptitude for research
2. Command of background, methods, and current works that apply to the specific area(s) encompassing the candidate's proposed research topic; demonstration of a creative ability for research

   Evaluation mechanisms for (1) and (2):
   a. Successful completion of an M.S. degree with thesis
   b. Successful completion of the Ph.D. preliminary examination
   c. Successful research topic proposal presentation
3. A Ph.D. dissertation prepared under the mentorship of the student's adviser and graduate committee that meets the following criteria:
   a. Displays original and creative scholarship
   b. Contributes new knowledge to the field
   c. Expresses good literate style
4. Successful defense of the dissertation before the candidate's graduate committee and any other members of the academic and scientific communities who desire to attend the dissertation defense

A. Minimum Credit Requirements

There are two general course requirements for Ph.D. students:

- Ph.D. students are required to take two structured courses * per academic year. Students must register for the courses, and only one may be taken as an audit. The structured courses can be selected from the 500, 600, or 700 level. With written adviser approval, the courses also may include structured graduate classes from other departments. When the student is within one semester of graduation, the student and adviser may petition the Department Head, in writing, for a waiver of the "two courses per year" requirement. While ATS 784 (Supervised College Teaching) is not considered a structured academic course, it is allowed to count toward the two courses per academic year Ph.D. requirement

- Ph.D. students must take a minimum of 42 semester credits beyond the (thesis option) master's degree (or 72 semester credits beyond the bachelor's degree). At least 21 credits beyond the master's degree (or 37 credits beyond the bachelor's

degree) must be earned in courses numbered 500 or above. ATS 784 does not count toward the 42 required credits

Audits count toward the department's requirement that all graduate research assistants enroll for at least 15 credit hours each semester as mentioned in Section IV.L. However, audits do not count toward the Graduate School's total required course credits for the Ph.D. and may not be listed on the GS 6 Program of Study form.

The student's graduate committee is charged with ensuring the student gains breadth in atmospheric science during their tenure in the program. Accordingly, the graduate committee may make recommendations on course work to be completed prior to graduation.

ATS 799 and ATS 784 are graded as S/U.

All Ph.D. students must take ATS 693 (1 credit), Responsible Conduct of Research, offered every spring semester.

*A structured class includes classroom instruction. All classes taught in the Department of Atmospheric Science are defined as structured except the following: ATS 695, ATS 699A-V, ATS 784, ATS 795, and ATS 799A-V.

B. Examinations and Required Committee Meetings

1. Preliminary Examination

See C. Preliminary Examination for full information.

2. Annual Assessment Committee Meetings

The objective of these required meetings with the student's graduate committee is to guide the student's proposed research and to evaluate progress towards the defense of their Ph.D. dissertation. These meetings are not exams. The first meeting should occur within 6-12 months of passing the preliminary exam and should focus on the initial Ph.D. research and plans for proposed research in the remainder of the Ph.D. Subsequent meetings should occur annually. In the last meeting prior to the student's planned defense, the student must demonstrate to the committee that they have successfully completed original, creative, and meaningful research. The proposed dissertation content should be outlined, and the student should discuss the plans to complete the remaining research and the timelines associated with it for committee approval.

For all meetings, students should talk to their advisors in advance about what content to include. We recommend the students prepare slides to guide discussion on work

accomplished, proposed work, and timelines, with the expectation of committee discussion throughout the slides. The meetings should be planned for 1-2 hours.

We encourage students to meet with the full committee together, either in person, virtually, or hybrid. If arranging a time for all committee members to meet at the same time is challenging, the student may meet with a committee member separately.

At the conclusion of each meeting, the adviser will report to the department head and graduate coordinator indicating whether the committee is satisfied with the student's research progress and proposed research program. If the committee is not satisfied with the student's research progress and approach, the advisor should outline steps for the student to follow in order to address this.

3. Final Ph.D. Examination

Upon completion of the dissertation, the Ph.D. candidate's graduate committee and other participating faculty administer an oral examination in which the candidate defends the dissertation. The exam outcome is reported to Graduate School within 2 working days via the GS24 form.

C. Preliminary Examination

1. Preliminary Exam Components

A Ph.D. student must take and pass the preliminary examination, generally within 12 months of defending the M.S. (or within 18 months of admission to the Ph.D. program, if the student completed the M.S. in another department). The outcome of the exam is reported to the department and Graduate School within two working days using the GS16 Prelim Exam Results form.

The preliminary examination is administered by the student's graduate committee. The purpose of the preliminary examination is to evaluate the student's knowledge of their field and their ability to independently formulate and propose a research project.

A Ph.D. student, in conjunction with their adviser, should begin forming a graduate committee as soon as possible after their admission to the Ph.D. program, normally in the first semester. The GS6 form is used to report the composition of the graduate committee (3 faculty members from ATS and one CSU faculty member from outside the department) and the proposed plan of study. Non-CSU employees are required to obtain faculty affiliate appointments in an academic department in order to be eligible to serve on graduate committees. They do not replace CSU faculty requirements.

a. Research Prospectus

i. Purpose of the Prospectus

The purpose of the prospectus is to evaluate the student's ability to independently formulate and propose a research project.

ii. Prospectus Elements

- Statement of the problem and its broader significance that is grounded in a summary of the existing literature which points to gaps in the current knowledge that motivate the proposed research
- Research questions and hypotheses
- A description of the proposed methods that is well-organized, appropriate for answering the research questions, and incorporates mechanisms to assess success. The proposed methods should thoroughly describe all tools and assumptions about their use. The approach should also include an explanation of how each research step is linked to the scientific questions and/or hypotheses. Check out previous successful examples
- A work plan that demonstrates a realistic understanding of the extent of the work involved
- A summary detailing the expected benefits that will result from the research
- A financial budget or statement of resources is not necessary

The prospectus should be submitted to the graduate committee at least three weeks prior to the scheduled written portion of the exam, and the committee should be notified by the student regarding when to expect this document. The three-week window can be shortened in response to a written request by the student, if all members of the committee agree there is sufficient time to create the written questions.

iii. Prospectus Guidelines

- The prospectus should be no more than 10 pages long no smaller than 11-point font. The 10 pages do not include the title page or the references but otherwise include all text and figures. References should be listed separately at the end of the prospectus
- The subject of the prospectus may be shared with the adviser prior to writing the prospectus, but the subject is at the discretion of the student
- While interactions with the adviser or other committee members are not forbidden during the writing process, it is incumbent upon the student to ensure the main objective of the prospectus, the demonstration of independent capabilities, is not compromised by these interactions. For example, having the adviser or other students read the prospectus and comment upon the content prior to submission is in clear contradiction of the objectives. Interactions with the CSU Writing Center (intended to aid non-native English speakers) are permissible as long as they do not impact the scientific content of the prospectus

- Advisors can assist students in planning their time to appropriately manage the prospectus writing process among other competing responsibilities
- Students are allowed access to a set of examples of successful prospectuses

b. Written Questions

i. Purpose of the Written Questions

The primary purpose of the written questions is to test the student's ability to use their understanding of topics pertaining to their field of research to synthesize and process complex information by critically analyzing the research literature through the use of written arguments, appropriate equations and current theory.

ii. Written Questions

- The graduate committee will meet and together develop three questions. The external graduate committee member is not required to attend this meeting
- At least one of the three questions must be based on one or more journal articles from the literature that fall within the general research area(s) of the student. In the context of the journal article(s), the questions may require the student to, among other things, critically review the article(s), place the article(s) in the broader context of the field, perform back-of-the-envelope calculations, defend a statement from first principles, discuss how to apply ideas in the article(s) to a different situation, etc.
- The student may use any reference materials required to answer the questions but may not consult with other persons
- The student has 48 hours to prepare and submit written answers to the questions. History has shown that working for the entire 48 hours is not beneficial
- If you have circumstances that make it difficult to complete the written questions in a single 48-hour period, please consult with the Associate Department Head about potential accommodations
- If you discover an error in the answers you have submitted, please correct the errors without consulting others and bring your revised responses to the oral examination

c. Oral Examination

i. Purpose of the Oral Examination

The purpose of the oral examination is to provide an opportunity for the student's graduate committee to ask questions about the student's prospectus, their responses to the written questions, and related topics in the student's area(s) of research.

iii. Structure of the Oral Examination

- The oral examination will begin with a presentation of the prospectus by the student. The student's presentation should last 15 minutes. Committee members may not interrupt the presentation except to ask brief clarifying questions
- The graduate committee will then ask questions related to the prospectus for 45 minutes. An upper limit of 1 hour is placed on the presentation and discussion of the prospectus
- Finally, the graduate committee will ask questions about the responses to the written questions and other questions in the student's area(s) of research for 45 minutes
- At the completion of the questioning periods, the student will be asked to leave the examination room to allow the committee to decide on the exam grade
- The total length of the oral examination cannot exceed 2 hours

2. Additional Information

a. Grading the Exam

Each of the three portions of the exam (i.e. prospectus, written questions, and oral examination) are weighted equally and each will be graded by the graduate committee as either "satisfactory" or "unsatisfactory." Outcomes of the full exam may be PASS, FAIL or PARTIAL PASS.

- Three "satisfactory" ratings will be given a PASS
- Two "satisfactory" and one "unsatisfactory" rating will be given a PARTIAL PASS
- One or zero "satisfactory" ratings will be given a FAIL

A PARTIAL PASS on the preliminary exam may require additional follow-up with the graduate committee, as will be documented in a department memo – but will be considered a pass according to the Graduate School (as specified in the GS16 form). Any follow-up requested by the graduate committee must occur within 6 months or less (to be specified by the graduate committee in the department memo) following the oral examination.

If a student FAILS the preliminary exam, they may be eligible for one re-examination. However, re-examination must be endorsed by the graduate committee on the GS16 form and must be completed within six months of the first attempt. Conditions to be met before re-examination are documented on the GS16 form.

A student who passes the preliminary exam will change status from Ph.D. I to Ph.D. II. The department requires a memo from the student's adviser to be notified of this change.

b. Notification of Exam

The student is responsible for arranging a time and place for the oral portion of the preliminary exam after consulting their graduate committee.

The student must notify the graduate adviser no later than three weeks prior to the exam. The date, time and place of the preliminary examination will be announced to all Atmospheric Science academic faculty members one week prior to the examination. The preliminary examination shall be administered at least two terms before the student's PhD defense. It is the candidate's responsibility to comply with these notifications.

c. Extenuating Circumstances

The student is expected to make every effort to comply with departmental timelines for admission and for passing the preliminary examination. However, in some cases, there may be extenuating circumstances that require modification of these timelines or the exam format itself. In such cases, the student and adviser may petition, in writing, to the graduate committee, outlining the reasons for the request and the proposed modified timetable and/or exam format. The department head will approve or deny the request.

Violation of departmental requirements and timetables will be considered grounds for dismissal from the program.

3. Preliminary Exam Timeline

Please see Appendix B Preliminary Exam Timeline.

D. Dissertation Requirements

Unless specifically authorized by their adviser, students are expected to make independent arrangements for drafting of their dissertations and must adhere to the format specified in the Graduate School Thesis Manual. The department assumes no responsibility for the mechanics of dissertation preparation.

A complete, typed final draft of the candidate's dissertation must be submitted to the student's committee at least four weeks before the final examination.

E. Summary of Procedures

Please see Appendix C Doctor of Philosophy Summary of Procedures.

VII. FINANCIAL ASSISTANCE AND COSTS

A. Financial Assistance

Financial assistance to graduate students is an integral part of the atmospheric science program, with 60 to 70 research and teaching assistants normally supported by faculty research programs and the department on instructional duties. One quarter to one third of these appointments usually become available annually to new students.

1. Graduate Research Assistantships

Graduate research assistantships (GRAs) normally are awarded to qualified students for the nine-month academic year commencing with the fall semester, but a few appointments may be awarded later in the year due to attrition or the initiation of new research projects. All applicants to both the M.S. and Ph.D. programs are considered for a GRA. Invariably, more requests are received for financial assistance than can be supported, so the selection of GRAs is quite competitive. The award decisions are generally made during the spring semester, to begin the following fall, when the availability of research funds for the next academic year has become fairly well established and sufficient applications have been received to select students on a relative merit basis.

The M.S. program is designed so that a student can complete the course and thesis requirements in 24-30 months. M.S. candidates generally receive GRA support for this entire period, subject to availability of funds. Students must maintain a cumulative GPA at CSU of 3.0 or better to receive a GRA.

a. Work Expectations

Students on a half-time GRA are expected to work a minimum of 20 hours per week on their research. However, graduate research assistants should not conclude that their research obligations may be satisfied by working a certain number of hours per week, nor that they are being paid to work a fixed number of hours and no further effort is necessary. They are working toward a degree, and by virtue of the availability of faculty-generated research projects that provide for reimbursed student participation, they are being afforded an opportunity for financial support while acquiring a graduate education. The more rapidly they advance in their work, the sooner they will obtain their degrees and be in a position to seek gainful employment.

b. Effective Dates

Assistantships are effective from either the first or 16th of the month for which they are awarded, depending upon the date the student reports for work in accordance with instructions received from the principal investigator. These

positions are not automatically renewed from one year to the next but are dependent upon the availability of funds, satisfaction of the principal investigator with the student's research performance, and the maintenance of academic eligibility by the student. The department requires 30 days' notice from the student in the case of a contractual cancellation, this in turn being the department's responsibility should student funding become unavailable. If students fail to fulfill their research commitments, the assistantship may be terminated, again with 30 days' notice.

c. Registration Requirements

GRAs are required to register for at least one research credit each semester and must be assigned a grade by the responsible principal investigator who measures the student's research performance. Any grade of "U" (or letter grade lower than "B") in either ATS 699 or ATS 799 for two successive semesters will result in loss of the assistantship regardless of academic standing or other considerations.

d. Pay Scales

GRA pay scales vary according to a student's level (M.S. or Ph.D.) and a student's advancement within that level. Advancement of a Ph.D. candidate from level 1 to level 2 is dependent upon the principal investigator's satisfaction with the student's research progress and the student passing the Ph.D. preliminary examination.

In general, GRAs are paid on a half-time basis during the academic year and on a three-quarter-time basis during the summer months, depending on the availability of funds and mutual agreement between the advisor and the research assistant. Pay rates are reviewed by faculty each spring and are announced before the next academic year. Salaries received by GRAs are subject to income taxes.

e. Leave Policies

During periods between semesters or when the University administrative offices may be closed and classes are not in session, graduate assistants usually concentrate on their research work. To the extent that the adviser and department head concur, GRAs may use such periods for leave without pay from campus. Alternatively, to the extent that they fulfill their research commitments to the principal investigator's satisfaction by prior overtime work, graduate students may be authorized compensatory time off during such periods.

GRAs are entitled to specific holidays as specified in the University Holidays & Closures calendar (https://calendar.colostate.edu/holidays-closures/).

Normally, these holidays include:

Independence Day (1)
Labor Day (1)
Thanksgiving (2)
Christmas (3)
New Year's Day (1)
Marting Luther King Day (1)
Memorial Day (1)
Juneteenth (1)

GRAs are also eligible for any days that are declared as well-being days. The University will communicate these days.

While University policy does not provide paid annual leave for GRAs other than holidays as specified in the University General Catalog calendar, department practice is to provide up to three weeks (15 days) of additional paid leave per year when classes are not in session (e.g. fall, spring, and summer breaks.) Students must coordinate leave with their advisors as early as possible to ensure that progress towards their degree is not adversely affected. Other than specific paid holidays as noted in the University General Catalog calendar, graduate assistants are expected to concentrate on their research during periods when classes are not in session. Students must discuss extenuating circumstances with their advisor as early as possible. Generally, students are expected to work in person on the ATS campus. Remote work may be accommodated for limited periods of time, but must be coordinated with the student's advisor.

f. Benefits

i. Tuition
Tuition for GRAs is paid for on their behalf with funding typically coming from a research project.

ii. Tuition Premium Program
Graduate School pays for the difference between non-resident and resident tuition for domestic non-resident students during their first year of study. International GRAs are included in the Tuition Premium Program for the full time that they serve as GRAs. This program only applies in the fall and spring terms.

iii. Waived Student Late Fee for First Billing Cycle
Late fees for GRAs are waived in the first billing cycle of each fall and semester as many do not receive their first paycheck until after the first billing cycle deadline. GRAs may disregard the first eBilling notification each semester.

iv. Mandatory Fee Coverage Plan
Mandatory student fees for GRAs will be paid on their behalf, generally through research projects. This does not include the college technology fee or the immigration services fee as they are not mandatory for all CSU students.

v. Student Employee Retirement Plan
When not enrolled in classes (i.e. summer), GRAs pay into SERP, a required alternative to Social Security for student employees at Colorado Public Higher Education Institutions who would have been required to participate in Social Security. Please visit the Human Resources website for more information.

vi. Family and Medical Leave Insurance Program (FAMLI)
GRAs who work and live in Colorado are eligible for FAMLI. Information about qualifying events and additional details regarding CSU's FAMLI plan can be found on the Human Resources website.

vii. Health Insurance Contribution
The Graduate School funds health insurance for GRAs. GRAs must be enrolled in at least 5 credits to receive this benefit. Additional information on qualifying criteria can be found on Graduate School's Assistantship Health Insurance Contribution website.

viii. Employee Assistance Program
Graduate Assistants are eligible to utilize the CSU Employee Assistance Program/ ComPsych. These CSU resources help with many aspects of your life – financial, physical, emotional, medical, family, and workplace wellness. Graduate Assistants must currently be enrolled in at least 1 credit (resident-instruction) with a minimum 0.25 full-time employment assistantship. GAs must be in good academic standing and making satisfactory progress toward degree completion. Benefits are available to GAs in addition to student services provided by the CSU Health Network and through the Student Health Insurance Plan.

ix. Sick Leave
The State of Colorado provides a leave option for State employees, including GRAs.
- Sick leave is accrued at one hour for every 30 hours worked, up to a maximum of 48 hours per year
- The leave may be kept for 6 months after separation and can then be reinstated
- Leave must be requested from supervisor or HR liaison

x. Workers' Compensation
Graduate Assistants performing work for which they are hired through and paid by CSU are eligible for Workers' Compensation.

xi. Volunteer Service Hours
CSU employees, including GRAs, are allowed eight hours of paid administrative leave each fiscal year to perform volunteer work. For more

information and a list of designated community organizations, visit the Volunteer Service Hours program webpage.

g. At Will Employment

Pursuant to Colorado State Statute, CRS 24-19-104, all graduate assistants are "employees at will" and their employment is subject to such pre-termination due process as may be required under the circumstances of each case. The provost/academic vice president must review and approve any recommendations concerning the termination of graduate assistants on any grounds, except for termination at the end of the stated employment period. The provisions of this section shall not be interpreted to authorize the termination of any graduate assistant for any reason that is contrary to applicable federal, state or local law.

2. Graduate Teaching Assistantships

A limited number of graduate teaching assistantships supported by funds provided to the department will generally be available to qualified students each semester for the nine-month academic year. These positions provide students with an opportunity to acquire teaching experience as a classroom assistant to the faculty instructor. Some classes may require that students develop and present lectures, laboratories, and discussion materials. Courses to which graduate teaching assistants may expect to be assigned include ATS 150, ATS 350, ATS 351, ATS 555, ATS 560, ATS 601, ATS 602, ATS 605, ATS 606, ATS 620, ATS 621, ATS 622, ATS 640, ATS 641, ATS 650, ATS 652 and ATS 655.

Graduate teaching assistantships normally are rotated among atmospheric science graduate students on a semester basis in order that a greater number may share in this opportunity to gain instructional experience. Inasmuch as most students are also graduate research assistants with research obligations to meet, departmental teaching assistantships are provided by a flat rate per month.

Graduate teaching assistants who are GRAs are required to register for at least one credit in Supervised College Teaching, ATS 784, during the semester in which they are appointed.

3. Fellowships

Students are encouraged to secure fellowships. Additionally, a number of government agencies and private industries offer long-range training programs in which employees receive full pay while pursuing an advanced degree at a university of their choice.

Each year, the federal government, through various agencies, (e.g., National Science Foundation) sponsors several hundred merit graduate fellowships in the physical sciences which are awarded to U.S. applicants. Applications must be submitted by

early November for the following academic year. Awards are made during spring for a maximum of three years. The NSF Graduate Research Fellowship Program website has additional information.

International students can sometimes obtain fellowships from their respective governments or from a sponsoring agency such as AID (Agency for International Development) or the African American Institute (AFGRAD).

The American Meteorological Society also provides a number of graduate fellowships. Students are encouraged to contact the AMS to learn about these opportunities.

B. Tuition and Fees

The Governing Board for Colorado State reserves the right to change the schedule for tuition and fees at any time. The most current listing of tuition and fees can be found at the Office of Financial Aid's website.

In accordance with a nationwide trend, graduate student tuition is not waived for GRAs at CSU. However, federal auditors have ruled that these tuition costs may be borne by the research contract or grant used to support the student's research. Thus, tuition costs need not be paid directly by the GRA. Because of the large difference between resident and nonresident tuition, all U.S. resident GRAs are required to petition for Colorado resident status as soon as possible (normally after one year of attendance at CSU.)

As noted in the Graduate Research Assistant section, those GRAs enrolled in at least 5 credits will receive a health insurance premium from Graduate School.

Tuition and fees are charged directly to student accounts. For GRAs, tuition and mandatory fees will be moved to a research project and Graduate School will pay the health insurance after census each fall and spring semester.

VIII. COURSES

A. ATS Courses

A full listing of courses taught in the department can be found on the CSU Course Catalog website.

B. Non-ATS Course Prerequisites

Some ATS courses will have prerequisites from other departments. This is to ensure that all students who enroll in the course have the necessary background for the course. See the table below for those courses.

Course Number	Description
CHEM 113	General Chemistry II Acid base reactions and equilibria, kinetics, coordination compounds, and oxidation reduction chemistry
CHEM 114	General Chemistry Laboratory II Laboratory applications of principles covered in CHEM 113
MATH 161	Calculus for Physical Scientists II Differentiation and integration of transcendental functions, sequences, series
MATH 255	Calculus for Biological Scientists II Derivatives and integral of functions of several variables, differential and difference equations, matrices, applications in the biosciences
MATH 261	Calculus for Physical Scientists III Vector functions, partial differentiation, cylindrical and spherical coordinates, multiple integrals, line integrals, Green's theorem
MATH 340	Introduction to Ordinary Differential Equations First and second order equations, series, Laplace transforms, linear algebra, eigenvalues, first order systems of equations, numerical techniques
PH 122	General Physics II Electricity including electrostatics and simple circuits; magnetism; optics; nuclear physics; radiation; biological, physical examples (non-calculus)
PH 142	Physics for Scientists and Engineers II Electricity and magnetism, circuits, light, optics (calculus based)
STAT 301	Introduction to Statistical Methods Techniques in statistical inference; confidence intervals, hypothesis tests, simple correlation and regression, one way analysis of variance

APPENDIX

A. Master of Science Summary of Procedures

Steps	**Deadline**
Online application for admission	6-12 months before first registration
Appointment of advisor	At time of admission
Selection of graduate committees	At the start of third semester
Filing of Program of Study (GS6 form)	Before fourth regular semester registration (around October for spring registration; April for fall registration)
Changes in committee (GS9A form)	When change is made; please be careful with timing in regard to final examination
Application for Graduation (GS25 form) *Any changes in coursework submitted on the Program of Study must be corrected on this form*	Second week of graduation term for fall and spring semesters; first week of 8-week summer term
Submit thesis to committee	4 weeks prior to final exam
Announcement of final exam *Title and abstract should be sent to graduate adviser for announcement*	2 weeks prior to final exam
Report of Results of Final Exam (GS24 form)	Within two working days after oral exam; for written exams, by the end of the 11th week of the graduation term for fall and spring and by the end of the 5th week of the 8-week summer term
Submit thesis to Graduate School (GS30 form) *Includes both the GS30 form and electronic submission of thesis*	By the end of the 11th week of the graduation term for fall and spring; by the end of the 5tgh week of the 8-week summer term

B. Preliminary Examination Timeline

TIME	STUDENT	PhD ADVISER	COMMITTEE MEMBERS	GRADUATE STUDENT ADVISER
Up to 3 months prior to oral exam date	Notify committee members and arrange acceptable date for prelim, reserve a room for oral exam			
As soon as the oral exam date is confirmed (at least 3 weeks prior to oral)	Notify graduate student adviser of date, time and location	Contact committee members to arrange prep of 3 questions, confirm date of written exam	Prepare potential written questions to submit to department office before written exam date	
More than 2 weeks prior to written exam date	Fill out the GS6 Program of Study form on RAMweb; discuss timing of written exam with graduate student advisor	Contact student about date of written exam (written prelim exam can be arranged for anytime between 8:00 a.m. to 4:30 p.m., M-F)		
At least 3 weeks prior to written exam	Submit written prospectus to PhD adviser, committee members, and graduate student adviser			
1 day prior to written exam		Submit questions (email) to graduate student adviser		
Date of written exam (approx. 10 days prior to oral exam)	Receive written exam questions via email from graduate student adviser			Have questions ready to send via email at agreed-upon time
48 hours after written exam	Submit written exam solutions to graduate student adviser 48 hours after receiving			Send copies of exam questions to PhD adviser and committee members; cc student
At least one week before oral exam	Initiate GS16 Preliminary Exam Results form in RAMweb			Prepare internal preliminary exam memo
Date of oral exam	Relax!		Decide on results and recommendation	Sign off on GS16 form so committee members will receive system emails

Continued on next page

TIME	STUDENT	PhD ADVISER	COMMITTEE MEMBERS	GRADUATE STUDENT ADVISER
Immediately after the end of the oral exam		Electronically sign GS16 Prelim Exam Results form	Electronically sign GS16 Prelim Exam Results form	Ensure GS16 Prelim Exam form is signed by all committee members and department head
Within a week of oral exam		Submit completed internal preliminary exam results memo to department head, cc graduate adviser		

C. Doctor of Philosophy Summary of Procedures

Steps	**Deadline**
Online application for admission	6-12 months before first registration
Appointment of advisor	At time of admission
Selection of graduate committees	At the start of your third semester
Filing of Program of Study (GS6 form)	Before fourth regular semester registration (around October for spring registration; April for fall registration)
Announcement of preliminary examination	To graduate student advisor 2 weeks in advance of target date
Preliminary examination	Within 12 months of M.S. (within 18 months of starting the Ph.D. program for those not completing an M.S. in our graduate program)
Report of preliminary examination (GS16 form)	Within 2 working days after preliminary exam
Changes in committee (GS9A form)	When change is made; please be careful with timing in regard to final examination
First annual assessment committee meeting	6-12 months after the preliminary exam; meetings should continue annually until student defends
Application for Graduation (GS25 form) *Any changes in coursework submitted on the Program of Study must be corrected on this form*	Second week of graduation term for fall and spring semesters; first week of 8-week summer term
Submit dissertation to committee	4 weeks prior to final exam
Announcement of final exam *Title and abstract should be sent to graduate adviser for announcement*	2 weeks prior to final exam
Report of Results of Final Exam (GS24 form)	Within two working days after oral exam; for written exams, by the end of the 11th week of the graduation term for fall and spring and by the end of the 5th week of the 8-week summer term
Submit dissertation to Graduate School (GS30 form) *Includes both the GS30 form and electronic submission of thesis*	By the end of the 11th week of the graduation term for fall and spring; by the end of the 5tgh week of the 8-week summer term