Graduate Handbook

Contents

Admission Criteria and Application
To be admitted to graduate study in Marine, Earth, and Atmospheric Sciences (MEAS), you must meet the following minimum requirements:

1. Hold an undergraduate degree in a relevant discipline of natural science, engineering, or mathematics.
2. Have a grade point average (GPA) of at least 3.0 on a 4-point scale (or equivalent). In special circumstances applicants are sometimes admitted with a slightly lower GPA if other qualifications demonstrate excellence.
3. Students whose native language is other than English must demonstrate an adequate level of proficiency in English. An overall score of 550 or higher is required on the paper-based Test of English as a Foreign Language (TOEFL) of the Educational Testing Service, with scores of 50 on at least two of the sections and no section score below 45. For the internet-based test (IBT), the minimum required TOEFL score is 80. A score from the International English Language Testing system (IELTS) exam is also acceptable. Details

Meeting these basic requirements does not necessarily lead to admission or financial support; actual decisions on these matters are decided on a competitive basis from semester to semester, and depend in part on the availability of funds and the overall number and quality of applications. No student will be accepted to the program unless at least one faculty member has agreed to serve as an advisor. ***Therefore, applicants are strongly encouraged to contact departmental faculty whose research interests align with theirs in advance of applying***.

To be considered for admission you must submit a completed "Application for Admission to the Graduate School," along with all required supporting information. Applications are made online via the Admissions section of the NCSU Graduate School web site.

The required supporting information is listed on the web site for online application; it includes:

1. A non-refundable application processing fee (see application instructions for current fee).

2. One copy of all transcripts for post-secondary academic work. Where applicable, a certified English translation must accompany the original. Foreign applicants must also submit copies of graduation certificates for all degrees held. At the time of application, unofficial transcripts will suffice, but official ones are required at the time of admission.

3. Three reference forms or letters from former professors, academic advisors, or workplace supervisors who can speak to your scientific abilities and potential for graduate study.

4. A TOEFL or IELTS score if you are from a country where English is not the primary language.

6. A brief resume with pertinent information regarding your previous experience and achievements.

7. A statement of intent, including a brief discussion (not to exceed 1500 words) of educational goals and career projections. You may also include a copy of previous written scientific work and be prepared to identify one or more MEAS faculty members whose interests match yours (and who may potentially serve as your graduate advisor).

8. A residence form, if claiming North Carolina residency for tuition purposes.

Applicants should comply with University application deadlines given in the online graduate application instructions. For example, for admission in the fall semester, the NCSU Graduate School deadline for application is June 25 for U.S. citizens and March 1 for international applicants.

A critical determining factor for admission is the availability of financial support in the form of teaching or research assistantships (see "Financial Support: Assistantships" below). Beginning in January, MEAS faculty begin reviewing graduate applications and making decisions on admission and assistantship awards. The majority of assistantship awards are made by the end of February, but additional assistantships may be offered on an ongoing basis, in rare cases as late as during the summer (if you are interested in the possibility of late admission, please contact the Graduate Administrator in MEAS or an MEAS faculty member in your field of interest to ask whether assistantships are still available). ***Give yourself the best possible chances for admission and financial support by applying by January 1 for the fall semester, and September 1 for the spring semester.***

Support

Assistantships

Nearly all full-time students in the M.S. and Ph.D. program have some form of financial support. *Please note that students in the one-year Climate Change and Society Program are not eligible for teaching or research assistantships or fellowships*. Teaching assistantships (TAs) and research assistantships (RAs) are awarded on a competitive basis each semester. RAs may be for 9- or 12-months duration, while TAs cover the 9-month academic year. TAs and RAs include a waiver of tuition costs, a salary payment to cover living expenses during the period of the assistantship, and health insurance.

The majority of MEAS graduate students on 9-month TA or RA appointments receive summer support, either from a summer RA appointment or one of the few summer teaching appointments that are available. In some cases, students not on a summer RA or teaching appointment find support through paid internships, fellowships, or other part-time or full-time work, often research-related work at the university. For students who do not receive summer support, the 9-month graduate student salary is sufficient to support a reasonable graduate student lifestyle for 12 months.

TA duties normally include teaching undergraduate laboratory sections but may include other related tasks as needed. RA funds are generally paid from a grant obtained by the graduate advisor; if you receive an RA appointment you will be involved in research work on the project funded by the grant. In most cases, this work will form part of your thesis or dissertation research. Corresponding with faculty members whose research areas are of interest to you is the best way to find out about the availability of RAs.

In order to maintain an assistantship, you must: (1) register for and successfully complete sufficient credits for full-time status each spring and fall semester, (2) maintain a 3.00 grade-point average, and (3) make satisfactory progress toward the completion of your thesis.

Establishing North Carolina Residency

NCSU graduate tuition is substantially more expensive for out-of-state students than for in-state students.

It is beneficial to the university, to your advisor, and potentially to you as well, if you establish tuition residency in North Carolina:

1. If you are an out-of-state student on a TA or RA appointment, the university is paying a high cost of out-of-state tuition for you, either from state funds or external grant funds; thus, it is beneficial to the university if you establish legal residency in North Carolina.

2. The Graduate Student Support Plan (GSSP) is a pool of funds from which graduate student tuition is covered (up until the time limit, and provided that students are full-time status, and are holding an assistantship). Remaining in out-of-state status drains funding from the GSSP pool unnecessarily.

3. NCSU guarantees tuition benefits for the first 4 semesters (not counting summers) to M.S. students making good progress (see above, "Financial Support: Assistantships") and 8-10 for PhD students. If completion of your degree requires more time (which is not unusual), and an extension of your TA or RA cannot be arranged (which is possible), you may be in a position requiring payment of some tuition for the additional semester(s). Even if you only register for 2 credits of MEA 699 (the minimum allowed by NCSU) during your additional semester(s) beyond the first 4 semesters, qualifying as an in-state student would save you significant costs (check the web site of the NCSU Cashier's Office for the current rates of in-state and out-of-state tuition).

If you are a U.S. citizen from outside North Carolina you will be strongly encouraged to demonstrate legal residency in North Carolina, for purposes of qualifying for in-state tuition, by the start of your third semester. If you are a North Carolina resident at the time of enrollment you will be asked to supply the required proof of this at the start of your first semester (more information). Note that if you are a U.S. citizen (North Carolina resident or otherwise), proving or establishing residency as soon as possible entails action on your part within the first few days of your first semester (or sooner). Please carefully review the information on this web site and take the necessary steps within the first week of your first semester. If you have any questions, please contact the Director of Graduate Programs in MEAS.

M.S. Graduation Requirements: Thesis Track

Last Revised: November 2020

The NCSU Graduate School and MEAS have established the following requirements for completion of the Master of Science (M.S.) program with thesis in MEAS. All must be met to complete the degree. (Items 5, 7, and the first part of 6 have been established by MEAS; all others are requirements of the Graduate School and can be found in the NCSU Graduate Administrative Handbook.)

1. 30 total credits are needed (this is the "30-credit requirement" referred to below).
2. At least 18 credits must be taken at the 500 or 700 level for letter grades (i.e., A+ through F scale), as opposed to research or seminar credits graded as "satisfactory" or "unsatisfactory".
3. A maximum of 6 credits of coursework at the 400 level may count toward the 30-credit requirement if they do not have an "MEA" prefix; courses below the 400 level do not count.
4. You are strongly encouraged to enroll in the First Year Graduate Seminar (MEA 611/612/613, with numbering dependent on discipline), but are not required to do so.
5. One credit of the MEAS seminar course (MEA 601) is required.
6. Marine Science M.S. students are required to take 2 of the 4 Marine Science core courses (Geological, Chemical, Biological, and Physical Oceanography) outside of their own areas of focus.
7. Six credits of MEA 695 (Thesis Research) are required, and no more than 11 may be counted toward the 30-credit requirement.
8. The other 5 credits required for the degree (in addition to the 25 required credits specified in items 4-6 above) may be in any form acceptable to your Graduate Advisory Committee (see below), subject to the other restrictions listed here.

9. MEA 699 (Master's Thesis Preparation) and MEA 690 (Master's Examination) may not be counted toward the 30-credit requirement.
10. No more than 3 credits of MEA 685 (Supervised Teaching) may be counted toward the 30-credit requirement.
11. No more than 12 "transfer" credits may be counted toward the 30-credit requirement (the different types of acceptable transfer credit are described in the NCSU Graduate Administrative Handbook, section 3.1).
12. A minimum GPA of 3.0 must be achieved in course work required for the M.S. degree.
13. The M.S. thesis and final oral exam must be successfully completed.
14. All degree requirements must be completed within 6 calendar years, beginning with the date that you first register for courses carrying graduate credit applicable to the M.S. program.

MEAS also offers the M.S. without thesis. Financial support in the form of teaching or research assistantships (defined below) is generally not available to non-thesis M.S. students. Graduation requirements for the non-thesis M.S. are those given above for the M.S. with thesis, except that items 4-8 and 12 do not apply because the 30-credit requirement must be fully met with coursework (no research or seminar credits). Note that non-thesis M.S. students will still form a committee, who will administer a final oral exam that is based on coursework and fundamental knowledge in the subject area.

Finding an Advisor, Initial Advisement

Planning and executing a research project and writing a thesis based on the results is a critical component of the M.S. program, and one that sets it apart from undergraduate study. The research aspect of the program can be thought of as a professional apprenticeship, in which you work closely with a faculty member who guides your research and provides advice on all aspects of your progress through the program. In fact, a committee of three faculty members is required for M.S. students. It is important that you identify this faculty member (your "advisor") as soon as possible so that you can begin the background work and planning for your thesis research project (see the section on "Thesis Research" below); students should establish their three-member graduate committee by the end of their second semester in the program.

Before applying to the program, you should attempt to identify an advisor by directly contacting individual faculty members whose research is of interest to you. Information about faculty research interests is found on the MEAS web site faculty page). Often these individual contacts, before or after an offer of admission, will be useful in identifying an advisor. If you identify a particular faculty member with whom you may be interested in working, you should call or e-mail him/her to discuss your interests and ask about his/her willingness to serve as your advisor. Note that students are not admitted to our graduate program without an assigned advisor. The key thing to remember is that you should take the initiative to talk to faculty members and find an advisor, based on your interests and the interests and availability of the faculty.

You should contact your advisor before your first semester starts to discuss your course work for the first semester. This can be done through e-mail or phone even before you arrive on campus. Also, at this time you can begin discussing potential thesis research with your advisor. Selection of a thesis topic and work toward a thesis proposal should begin as soon as possible (see "Thesis Research" below). In addition to meeting with your advisor, you may want to seek out introductory meetings with other faculty members of the department whose research fields are of potential interest to you.

Thesis Research

While coursework is required for the M.S. degree and is important, we consider the focus of the M.S. program to be completion of a thesis involving original research. Completion of the M.S. degree in two years requires that you begin your research as soon as possible. Students sometimes underestimate the

time required for carrying out research and writing a thesis; experience shows that two years go by quickly! Thesis research should begin in the first semester, with at least background readings and discussions of these readings with your advisor, and possibly preliminary lab, field, or computer work. This background and preliminary work during your first 1-2 semesters serves as the basis for your thesis proposal (see "Thesis Proposal" below). Your first summer will normally be your first opportunity to carry out research without concurrent coursework and should be a time for significant progress. Your research will then continue through your second year (you should try to have all your coursework completed by your third semester at the latest, so that you can complete your thesis without interruption). The bulk of your last semester should be devoted to writing your thesis.

Plan of Graduate Work, Graduate Advisory Committee

Each M.S. student at NCSU is required to prepare a "Plan of Graduate Work" (which is known by the acronyms GPOW and POW) with a schedule for taking the 30 credits required for the M.S. degree. Your plan will be prepared by you with the help of your advisor, submitted online through MyPack Portal, and must be approved by your "Graduate Advisory Committee" (GAC). Your GAC consists of your advisor and at least two other NCSU faculty members (at least one of whom must be a regular, non-adjunct faculty member in MEAS) chosen by you and your advisor. While you will work most closely with your advisor on your POW and research, the GAC will have input on and must approve both your POW and your research thesis. You should work closely with your advisor to develop your POW, preferably before the end of your second semester but in no case beyond the end of your third semester (counting summer as a semester) in the M.S. program. Once developed with your advisor, you will present your POW to your full GAC at a meeting, for their comment (including possible revision) and approval. At this same meeting you will also present your plan for thesis research to your GAC, for their comment and approval (see "Thesis Proposal" below).

You should choose the courses for your POW in close consultation with your advisor, in such a way that your POW will satisfy the criteria listed above in the "Graduation Requirements" section. Up to 6 credits of graduate coursework may be transferred from another accredited university toward your M.S. requirements, provided the credits were completed with a grade of "B" or better, were not used to satisfy your Bachelor's degree requirements, and are considered acceptable as part of your POW by your advisor and GAC.

As noted above, you must have a minimum grade point average (GPA) of 3.0 to graduate from the M.S. program. Your GPA will be based only on formal lecture and/or lab courses, not research credits (MEA 693, 695, or 699). You may lose your financial support (teaching or research assistantship) if your GPA drops below 3.0. Refer to Section 3.20 of the Graduate Administrative Handbook for information on the conditions for academic warning, probation, and termination from the graduate program; click here for more information on academic difficulty.

Thesis Proposal

As soon as possible, but no later than about the mid-point of your second semester, you should identify a thesis topic. At this time, working closely with your advisor, you will prepare a short, written proposal for your thesis research. The proposal should address a scientific problem of some significance, should contain a specific and feasible methodology that is appropriate to the problem, should be logically and clearly presented, and should reflect your sound understanding of coursework and research literature relevant to the topic. At your first meeting with your GAC (the meeting at which you also present your POW), it is helpful to give a short (20-30 minute) oral presentation of your research proposal, after which the members of your GAC will question you about the work and offer feedback on scientific and practical aspects. Your GAC as whole may suggest (or even require) that some aspects of the research plan be modified; you should take careful notes of these comments (have a pen in your hand during the discussion) and address them as you continue in your research during the coming months.

This first meeting with your GAC is very important, as it should lead to the approval you need to carry forward with your POW and research (perhaps modified on the basis of comments from your GAC). You should schedule this meeting after your advisor has agreed that your POW and thesis research proposal

are ready for distribution to the full GAC. Also, you should make sure that all members of your GAC have your written proposal at least 2 weeks before the meeting. In some cases, a faculty member may want to see the proposal before even agreeing to serve on your GAC, in which case the proposal must be prepared and shared with the faculty member before the GAC membership is finalized and the meeting scheduled.

Thesis Preparation
Guidelines for thesis preparation and electronic submission at NCSU can be found here. These guidelines must be followed exactly.

Your thesis is submitted first to your thesis advisor (wholly or in sections, depending on your advisor's instructions to you). Generally, your advisor will require revisions as part of a normal iterative process of producing a high-quality draft suitable for distribution to your GAC. Once your advisor feels the thesis is ready to present to the full GAC, you will distribute copies to the other members, and at that time also schedule your final oral exam with your GAC members. You must provide copies of your thesis to your GAC ***at least 2 weeks*** before your final oral exam. At this time, you should also inform the MEAS Student Services Coordinator of the date and time of your exam, and he/she will find and schedule a room for the exam.

Closer to the date of your final oral exam, you may visit with each committee member and ask whether they have comments or suggestions to relay to you before your exam. They are under no obligation to provide comments at that time, but you should be prepared to act on any that arise.

Final Oral Exam
At your final oral exam, you will present your results in a seminar to the department and answer questions from the audience. After this open presentation and question/answer period, your GAC will question you about the results of your project and related background knowledge in more detail. You will then leave the room while your GAC evaluates your performance.

Possible outcomes include:
1. Unconditional pass: This involves minor revision to your thesis. In this case members of your GAC, with the exception of your advisor, may "sign off" on your thesis indicating their acceptance pending the final minor changes, with the understanding that your advisor will guarantee the changes are made; after making the necessary changes you will submit a revised version to your advisor for his/her approval and signature. In some cases, one or members of your GAC may prefer to see the revised version of your thesis before they sign off on it. In this case you will make the required changes and submit a revised version to your advisor for his/her approval and signature. You will then forward the thesis to the other members of the GAC for their review and signature.

2. Conditional pass: This usually involves major revision to your thesis, or inadequate performance on the question and answer portion of the exam. In this case you will make the required changes and submit a revised version to your advisor for his/her approval and signature. You will then forward the thesis to the other members of the GAC for their review.

3. Failure: In this case your GAC has found serious deficiencies in your written thesis and/or performance during the final oral exam. A second attempt at the final oral exam may be scheduled. The GAC members will provide clear feedback on changes necessary in your written thesis and/or in your performance during the exam. Your advisor will work with you to ensure those changes are made prior to your second attempt at the exam. This outcome is rare, and can be avoided by careful attention to a few common-sense points:

· Be sure there is clear agreement among members of your GAC, at the completion of your first meeting, about the requirements and expectations for your thesis.

· Do careful, quality work in your research and writing, in close contact with your advisor.

· Keep your GAC informed of your progress between your proposal defense and your thesis defense, especially if there are changes in the scope or focus of your work after your proposal presentation at your first GAC meeting. MEAS guidelines indicate that you should meet with your GAC at least twice per year.

· Prepare well for your final oral exam (i.e., construct a good talk with clear visual aids, practice the talk several times before the exam, try to anticipate likely questions and formulate answers in advance). After the thesis is approved by all committee members, final copies should be prepared with careful attention to the NCSU thesis Guidelines. In recent years, it is less common to prepare a bound copy for your advisor and committee members, but some still request this.

Each semester the Graduate School publishes the deadline by which a completed thesis must be submitted for graduation in that semester. It is important to be aware of this deadline and keep it in mind when scheduling your final oral exam. Given that making (and obtaining GAC approval for) even relatively minor changes can take 1-2 weeks, you should schedule your final oral exam at least 2 weeks before the deadline for thesis submission if you hope to graduate at the end of the semester in which you defend your thesis.

Organization of Research Materials Upon Graduation

While your thesis should represent a complete presentation of your research findings and conclusions, there may be important supporting research materials that are not included directly in your thesis (e.g., large data files, output files from computer programs, photographs, samples, large maps, experimental notebooks, etc.). These materials may be of critical importance to your advisor in publishing papers, supplying required reports to funding agencies, and working with other students (e.g., in continuing the research enterprise after your graduation). Original computer files with the material in your thesis (text, graphics) may also be very useful to your advisor and to other graduate students working with him or her. Because of this, you are required to prepare and leave behind an organized archive of all research materials (especially computer files) for your advisor prior to graduation. Different advisors will have different standards for this archive, your advisor will provide guidance on his/her preferred content and format. This requirement is not difficult to meet if your materials are organized and backed-up in a systematic manner from the beginning of your research.

Nothing in this requirement is intended to modify or supersede the NCSU policies on intellectual property and copyright (REG 01.25.3) or the UNC Copyright Use and Ownership Policy that applies to the entire University of North Carolina System, including NCSU Regulation 01-25-03. These policies afford university faculty members, students, and staff members certain rights and responsibilities with regard to their creative works. The purpose of this section of the MEAS Graduate Handbook is simply to inform you of your responsibility to leave your research materials in good and useful order upon graduation, subject to the terms of the NCSU/UNC policies cited above, for the continued good of the research program in which you carried out your thesis work. As an M.S. graduate from MEAS, you will have benefited from participation in a research program that existed because of the efforts of your advisor and his or her previous students; your parting obligation to the program is to help your advisor pass it on to the next student, as you found it or better.

The results of most of our M.S. theses in MEAS are published in peer-reviewed scientific journals, and in practice this often occurs after the graduated author of the thesis has left the university. While the task of writing the paper may fall to your advisor after you have graduated and moved on, you should expect to contribute to the publication effort by at least meeting the requirement of this section. Some students also take a more active role in the publication process, something generally welcomed by the faculty. Normally you and your advisor would be co-authors of any journal paper(s) resulting from your thesis.

Change of Thesis Advisor after Approval of POW and Thesis Proposal

In some instances, students may change advisors during their course of graduate study. The earlier this transition is made, the less impact it will have on both the student and advisor. Changes made after the student has carried out a substantial amount of work (e.g., after having approval for your POW and thesis

research proposal) are rare but not impossible and require approval from the MEAS Director of Graduate Programs and Department Head. We expect that you and your advisor will agree before the request is submitted, and that approval will be routine. If you and your advisor disagree over the change, you are both urged to discuss it with the Director of Graduate Programs, and then with the Department Head if necessary, and make every effort to resolve the disagreement. If the disagreement is resolved in this way, you will submit a written request for change of advisor to the Director of Graduate Programs and Department Head, and their approval of the request should be straightforward. If the disagreement is not resolved in discussion, you may still present your written request for a change of advisor to the Director of Graduate Programs and Department Head. Your advisor may also submit a written explanation of his or her arguments against the change (e.g., he or she has invested a great deal of funding and training in you and feels you should follow through on this investment and complete your thesis). The Director of Graduate Programs and Department Head will consider both arguments and reach a decision on your request (in the event that they disagree, the Department Head's decision will prevail).

Information useful to graduate students can be found at a number of different web sites:

The online New Student Survival Guide of the NCSU Graduate School

The web site of the MEAS Graduate Student Association (GSA)

Ph.D. Program Description

Last Revised: November 2020

Purpose

This section provides a condensed description of the PhD program in the NCSU Department of Marine, Earth, and Atmospheric Sciences (MEAS). The intended audience includes current graduate students, faculty, and prospective students. Following a brief checklist, a more detailed description of program requirements, the purpose and structure of examinations, and other programmatic aspects are presented.

Short Checklist and Timeline:

1.) Admission

2.) First year:

If initially an out-of-state resident, take steps to obtain NC tuition residency early on.
Before end of second semester, form PhD advisory committee, consisting of at least 4 faculty members, of which the chair must be a MEAS faculty member.
Submit Graduate Plan of Work, to be approved by committee.
Schedule and conduct meeting with advisory committee.
It is highly recommended that all incoming students enroll in first-year graduate seminar course [MEA 611 (Marine), 612 (Earth), or 613 (Atmospheric), for 1 credit] unless the student has taken this course previously as a MS student.

3.) Second year:

Enroll in graduate seminar course (MEA 801) if the student has not taken this course previously as a MS student (MEA 601).
Meet with advisory committee and chair to discuss preliminary exam schedule.
Schedule and complete PhD Written Preliminary Exam.
Schedule and complete PhD Oral Preliminary Exam as soon as possible after the written exam.

4.) Third year:

Stay in communication with graduate committee regarding research progress, hold periodic meetings with committee.
Outline dissertation and timetable for completion of degree.

5.) PhD Final Defense:

Schedule and successfully defend PhD dissertation (final oral exam), complete and submit PhD dissertation.

6.) Attend MEAS and NCSU graduation ceremonies, complete exit interview with Graduate Services Coordinator.

A. Admission

Students with ***exceptionally strong qualifications*** may apply directly for admission to the PhD program in their initial application, without first completing a MS degree. However, many students wish to complete a MS degree first, and many faculty advisors also prefer this route. More commonly, students apply to the PhD program having already earned a MS degree in a related field, sometimes from MEAS.

Students applying to the MEAS PhD program must meet the following minimum requirements:

1. Hold an undergraduate degree in a relevant discipline of natural science, engineering, physics, chemistry, or mathematics.

2. To gain admission as a PhD student, applicants must demonstrate excellence in their field of study, and this should be evident in the GPA and letters of recommendation. Other documented examples of excellence could include outstanding prior research accomplishments (e.g., publishing a peer-reviewed article in a reputable journal), and awards or honors for research or teaching.

3. Students whose native language is other than English must demonstrate an adequate level of proficiency in English as a foreign language. A score of 80 or higher is required on the Test of English as a Foreign Language (TOEFL) of the Educational Testing Service, with a minimum score of 18 on each of the four exam sections. Details

Meeting these requirements does not guarantee admission or financial support; decisions on these matters are determined on a competitive basis and depend in part on the availability of funds and the size and strength of the applicant pool.

A. Examinations

The MEAS PhD program does not have a qualifying examination (defined here as an examination that is taken before students are admitted to the PhD program). However, there are two preliminary examinations, each serving a distinct purpose. The collective objective of these examinations is to ensure that the student is adequately prepared for PhD-level research, including a command of the fundamentals in their broad subject area (e.g., air quality, geomorphology, chemical oceanography, atmospheric dynamics, etc.), and possession of the creative ability to identify and solve challenging problems in the geosciences.

The following are recommended guidelines for the PhD examinations.

1.) PhD Written Preliminary Examination

Purpose: The written preliminary exam allows the PhD committee to ensure that the student has solid fundamental knowledge in their area of study. In preparing for and successfully completing the examination, students synthesize and evaluate prior work, and demonstrate understanding of critical concepts and methods. They must not only demonstrate thorough knowledge, comprehension, and understanding of the material, but they must be able to apply, evaluate, and synthesize concepts in a meaningful and creative fashion befitting a PhD student.

Content: While some degree of flexibility in examination content is necessary in our diverse department, there is a requirement for consistent rigor across MEAS. The committee chair coordinates the examination and is ultimately responsible for reporting the outcome. Each committee member, along with

the chair, contributes written examination questions to be completed by the student. The difficulty level of the questions asked should be comparable to or more rigorous than a typical final exam question in a 700-level MEAS course. Students are encouraged to consult with their advisor and committee members several months prior to the exam and receive guidance as to how best to prepare. It is recommended that PhD committees hold internal discussions regarding the student and exam and agree on some key concepts and topics. The questions may cover any phase of course work taken by the student during graduate study or any subject logically related to an understanding of the subject matter in the areas of study. Questions are designed to measure the students' mastery of their field and the adequacy of preparation for research.

Scheduling and Timing: As its name and purpose imply, the written preliminary examination should be scheduled prior to or in the early stages of the dissertation research project. Typically, once a student has completed the bulk of their coursework, they should initiate discussions with their advisory committee concerning the scheduling of the exam. The Written Preliminary exam should be scheduled during the second year in the PhD program, and without exception should be completed before the end of the students' 6th semester in the PhD program.

Administration: The committee chair should coordinate the written preliminary examination by communicating directly with the other committee members, and by assisting in the administration of the exam as appropriate. Committee members email an electronic version of their portion of the exam to the committee chair, along with specifications for the allotted time, and in what format (e.g., closed book, closed internet) the exam is to be taken. Once the student has completed all portions of the exam, each committee member grades his/her portion of the exam. It is recommended that the committee then meets (face to face or via videoconference technologies if necessary) to undertake a collective evaluation and discussion of the exam outcome.

Outcomes: Possible outcomes include Unconditional Pass, Conditional Pass, or Failure. In the event of a Conditional Pass, the committee must clearly indicate the conditions to the student. Once all committee members agree that a student has unconditionally passed the exam, the committee chair completes the written exam form and distributes it for the signatures of other committee members. Remote committee members may email the outcome of their portion of the exam, which is printed and affixed to the written exam form in lieu of a signature. The completed form is finally submitted to the Director of Graduate Programs (DGP) or the MEAS Graduate Services Coordinator. In the event of an initial conditional pass, the written exam form need not be turned in at that point in time; only a final completed form should be turned in once an unconditional pass has been achieved. This is required before the Oral Preliminary exam can be scheduled. More info

2.) PhD Oral Preliminary Examination

The requirements for the PhD Oral Preliminary Examination are defined with greater specificity at the University level than are those for the Written Exam. More info

Purpose: The PhD Oral Preliminary Examination requires the student to articulate and orally defend their proposed research project, while demonstrating a command of fundamental knowledge in their field of study. The student motivates and presents fundamental questions and hypotheses, along with proposed hypothesis tests and/or experimental design strategies. Students are encouraged to consult with their committee to best gauge how to prepare for the oral prelim exam.

Content: The oral examination is designed to test the student's ability to articulate and defend a proposed research project, but also to relate factual knowledge to specific circumstances, to use this knowledge with accuracy and promptness and to demonstrate a comprehensive understanding of the field of specialization and related areas. Three components are involved: (i) the student will typically provide a written dissertation proposal to their committee members two or more weeks in advance of the scheduled oral examination; (ii) the student will deliver an oral seminar, typically lasting about 40 minutes (open to all

Graduate faculty); (iii) the student, their advisory committee, and any other members of the graduate faculty wishing to attend will participate in a closed-door question and answer session following the seminar. While the level of rigor must be consistent, the content areas of these questions can vary widely and are up to the individual committee members to determine.

Outcomes: Following the closed-door Q&A session, the student is excused, and the committee members discuss the outcome to develop a consensus. As with the written exam, possible outcomes include Unconditional Pass, Conditional Pass, or Failure. Only the advisory committee and graduate school representative will be allowed to participate in the final deliberation concerning the outcome. From the Graduate School Handbook:

(i) Passing the preliminary oral examination. A unanimous vote of approval of the advisory committee is required for passing the oral preliminary examination. Approval may be conditioned, however, on the student's meeting specific requirements prescribed by the student's advisory committee. These conditions must be written in a clear and distinct way such that the student clearly understands what is expected.

(ii) Failure to pass the preliminary oral examination. Failure of a student to pass the preliminary oral examination terminates his or her work at this institution unless the advisory committee recommends a re-examination. No re-examination may be held until one full semester has elapsed and only one re-examination is permitted.

Scheduling and Timing: Upon satisfactory completion of the written preliminary examination, the student must work with their advisory committee to identify a date for the Oral Examination. This should be as soon as possible (not more than 6 months) following completion of the Written Prelim exam. Once a date and time have been identified and agreed upon, the student should contact the Graduate Student Services Coordinator via email, and provide information including the agreed-upon date and time. If a Graduate School Representative (GSR) has already been assigned to the student's committee, then the Graduate School responds to the request within five working days of its receipt in the Graduate School. If the GSR has yet to be assigned, or if a change is necessary, the Graduate School may take up to 10 working days to respond to the request (see “administration” section below for more on this). At this point, a room reservation is also made by the Graduate Services Coordinator.

Administration: After the Graduate School has approved the scheduling of the preliminary oral examination, the Records Unit mails copies of the signed and dated request form to the committee chair, committee members, Graduate School Representative, and graduate student listed on the form. A file copy of the approved request form is also sent to the DGP. In the event that one or more committee members will not be physically present, a separate request form must be completed. This rule also applies to the Final Oral Exam. Committees that consist entirely of MEAS faculty, including those adjunct through MEAS, are required to include a Graduate School Representative (GSR). The GSR serves as an objective observer, who ensures the legitimacy of the exam process and the fair treatment of the student. Committees including at least one non-MEAS faculty member are not required to have a GSR. The Oral Preliminary Examination is administered through the Graduate School, and a standard form is to be completed and signed by all committee members. The form must be returned promptly to the Graduate Services Coordinator for processing as soon as possible after the exam outcome is known. The doctoral student is admitted to ***candidacy*** by the Graduate School upon successfully passing the preliminary examinations. This does not include students receiving a 'conditional pass.' Forms for reporting the exam outcome are sent to the Graduate Student Services Coordinator and are kept in the student’s file until the time of the exam. At that point, the committee chair obtains the forms, returning the signed forms with the final outcome promptly upon completion of the exam.

3. Final Oral (Comprehensive) Examination

Purpose: The student must demonstrate the ability to present his/her dissertation research to a public audience, and answer a wide range of questions from any seminar attendees as well as their graduate

advisory committee. This is the final opportunity for the student to demonstrate knowledge and ability befitting a PhD student.

Content: As with the preliminary oral examination, the chair of the student's advisory committee is in charge of conducting the final oral examination. The Final Exam includes four elements: (i) The student should distribute a complete draft of their dissertation to all committee members at least two weeks prior to the scheduled defense; (ii) An oral presentation is provided by the candidate, open to the public and department. This presentation is typically about 40 minutes in length, and is followed by a public Q&A session; (iii) The candidate is then questioned in a restricted session that must include the graduate advisory committee, if appropriate a graduate school representative, and any other members of the graduate faculty wishing to attend; (iv) Deliberation of the committee and GSR to reach a unanimous decision concerning the outcome of the exam.

Scheduling and Timing: The process for scheduling the final oral exam is the same as for scheduling the preliminary oral examination. Each semester the Graduate School publishes the deadline by which a completed thesis must be submitted for graduation in that semester. It is important to be aware of this deadline and keep it in mind when scheduling the final oral exam. Given that making (and obtaining committee approval for) even relatively minor changes can take 1-2 weeks, the final oral exam should be scheduled at least 2 weeks before the deadline for thesis submission if order to maximize chances of graduation at the end of the semester in which the thesis is defended.

Once a date and time have been identified and agreed upon, the student should contact the Graduate Student Services Coordinator via email, and provide information including the agreed-upon date, time, and title of the dissertation. The final oral examination is scheduled after the dissertation is complete except for such revisions as may be necessary as a result of the examination, but not earlier than four calendar months after admission to candidacy and not before all required coursework has been completed or is currently in progress.

Administration: After the Graduate School has approved the scheduling of the final oral examination, the Records Unit mails the signed and dated request form to the committee chair, committee members, Graduate School Representative, and graduate student listed on the form. A file copy of the approved request form will be sent to the DGP. In the event that one or more committee members will not be physically present, a separate request form must be completed. If the GSR has already been assigned to the student's committee, then the Graduate School responds to the request within five (5) working days of its receipt. If a Graduate School Representative has yet to be assigned, or if a change is necessary, the Graduate School may take up to 10 working days to respond to the request. The student has the responsibility of contacting the GSR when scheduling the final examination. As with the oral preliminary exam, the committee chair should return the completed exam form to the Graduate Student Services Coordinator promptly and as soon as the outcome of the defense is known.

Outcomes: Following the closed-door Q&A session, the student is excused, and the faculty discuss the outcome in order to develop a consensus. As with the preliminary exams, possible outcomes include Unconditional Pass, Conditional Pass, or Failure. Only the advisory committee and graduate school representative will be allowed to participate in the final deliberation. From the NCSU Graduate School Handbook:

(i) Passing the final oral examination. A unanimous vote of approval of the advisory committee is required for passing the final oral examination. Approval may be conditioned, however, on the student's meeting specific requirements prescribed by the student's advisory committee. These conditions must be written in a clear and distinct way such that the student clearly understands what is expected.

(ii) Failure to pass the final oral examination. Failure of a student to pass the final oral examination terminates his or her work at this institution unless the advisory committee recommends a re-examination.

No re-examination may be held until one full semester has elapsed and only one re-examination is permitted.

B. Graduation Requirements
The following are requirements for completion of the MEAS Ph.D. program:

1. 72 total credits are required beyond the BS degree.
2. Students can transfer up to 36 graduate-level credits taken at NCSU from their MS degree towards the PhD, but only if there is no break between MS and PhD study. Externally, up to 18 credits can be transferred with the approval of the advisory committee; the limit is also 18 credits if there is a gap between an NCSU MS and PhD.
3. Courses at or below the 400 level cannot count toward the 72-credit requirement; 900-level courses cannot be used. Ph.D. students typically take 5 or more courses beyond the MS level as doctoral students.
4. One credit of the MEAS seminar course (MEA 801) is required, unless the student has completed MEA 601 as a MS student. The First-Year graduate seminar course is not required at this time but is strongly recommended.
5. Successful completion of written and oral preliminary examinations.
6. A complete dissertation approved by all members of advisory committee.
7. A successful final comprehensive oral examination.
8. Students must attain PhD candidacy within 6 calendar years, and a total of 10 years to meet all PhD requirements, even with an approved leave of absence. More info
9. Residence at the university, pursuing graduate work, for at least one academic year.

C. Other Aspects:
Students should complete an exit interview with the Graduate Services Coordinator as soon as possible after their final exam. These interviews are an important means of providing feedback to the department and can serve to improve the graduate program.

Disciplines and Fields of Concentration

Atmospheric Science
· Weather Analysis and Prediction
· Mesoscale Meteorology
· Air Quality and Air Pollution Meteorology
· Climate Change/Modeling
· Physical Meteorology
· Air-Sea-Land Interactions
· Severe Local Storms
· Atmospheric Boundary Layer Meteorology
· Tropical Meteorology

Marine Science
· Physical Oceanography
· Chemical Oceanography
· Biological Oceanography
· Geological Oceanography

Geology
· Geomorphology and Surficial Processes
· Geochemistry
· Geophysics
· Glaciology
· Hydrogeology, Hydrology

· Igneous Petrology and Volcanology

· Paleoclimatology
· Sedimentology and Stratigraphy
· Structural Geology

Courses

MEAS Graduate Student Checklist

Year ONE:
1) Online forms for direct deposit, state & federal tax, & ISA (Information Security Acknowledgement) are completed and submitted through MyPack Portal. To access the portal, go to the NCSU homepage and click the tab designated "MYPACK PORTAL." Under MyPack Login, sign on with your Unity ID (initials of first and middle name and first 6 characters of last name) and your 8 digit password (last 4 digits of student ID# and number of birth month and birth date). **All online forms are to be completed within the first three days of the semester.** International students have an independent orientation session, conducted by the office of international studies.

2) Obtain key to your assigned office from the main office, coordinate with the student services coordinator or graduate program director for specific instructions.

3) Take steps towards establishing NC residency for tuition purposes (US students from out of state) before or early in the first semester. See *Instructions Concerning the Establishment of N.C. Resident Status*

4) With the aid of your advisor, select and register for courses for the fall semester *(9 credit hours per semester are required for those students who are on assistantships in the fall and in the spring).* Do the same for the spring semester in the pre-registration period which occurs in mid-fall. Be sure to register before the end of the first week of class (and if 9 hours are required you must remain registered for 9 hours for the entire semester to ensure full benefits and the ability to hold an assistantship). Audit and Credit Only courses ***do not count*** towards the required 9 hours.

5) Select a research topic.

6) Start thesis or dissertation research.

7) With aid of your advisor select at least 2 (for MS students) or 3 (for PhD students) additional faculty to serve on your advisory committee and secure their consent to serve. At least two members (including your advisor) must be permanent MEAS faculty. Other members may be faculty from other departments or adjunct professors with Graduate Faculty Status.

8) Before the end of the second semester, submit your committee names and Plan of Work (POW) online. The POW requires the names of committee members and a list of courses taken and to be taken. Both MS thesis and non-thesis students need a minimum of 30 hours and PhD students a minimum of 72 past the BS or 54 past the MS. Credit Only and Audit courses do not count towards the minimum requirement. All graduate students must have a GPA of 3.00 or higher to graduate, and you must maintain a 3.00 GPA or higher in order to hold an assistantship.

Departmental graduation requirements:

MS Thesis students: 1 hour of MEA 601 (Graduate Seminar taken in the 3rd or 4th semester) and at least 6 hours of MEA 695 (MS thesis research). Marine Science students take two core courses outside of their area of focus. Final thesis defense and examination are conducted by the committee.

MS Non-thesis students: A minimum of 10 three credit hour, graded lecture courses. MEA 601, 693, and 695 are not allowed in fulfilling this requirement. An exit examination is administered by the graduate committee upon completion of coursework.

PhD students: Only MEA 801 (Student seminar) is required by the department. Most Ph.D. programs have many hours of MEA 895 (PhD Research); appropriate courses are determined by you and your committee. Marine science students take three core courses outside of their areas of focus. Written and oral preliminary examinations are conducted by the committee, in addition to a final defense examination.

Graduate School requirements for MS program:

- At least 18 hours (usually 6 courses) of letter graded (A, B, etc.) courses at the 400, 500, or 700 level.
- No more than 6 hours at the 400 (senior) level; 400 level MEA courses do not count in the minimal program.

9) Once the Plan of Work is submitted, you must meet with your committee at least once a year.

Year TWO and after: You must register each fall and spring until you graduate. If you take your final oral and/or submit your thesis/dissertation over the summer, you must be registered then as well. Students on assistantships must register for the minimum number of hours given (see Pocket Chart handout).

For MS students:

- Take seminar in 3rd semester (4th at the latest)
- Meet with committee at least once each year
- Complete coursework on Plan of Work (POW)
- Complete research on thesis
- Write your thesis
- Submit online Application for Graduation within first 6 weeks of semester that you anticipate graduation.
- Submit thesis to your committee two weeks before the final exam
- Take final oral exam *(must be scheduled through the Graduate Student Services Coordinator with 2 weeks' notice)*
- Pass the oral exam. Your final semester of registration (usually MEA 699) is to be the semester during which your completed thesis or dissertation is submitted to the Thesis Editor. There are specific date deadlines. You cannot submit your thesis until you pass the oral exam Unconditionally. If you receive a Conditional Pass, you must satisfy these conditions before you can submit the thesis for review. If you have been admitted to our PhD program registration is allowed.
- Submit a PDF of a draft of your thesis to the thesis editor sometime after you have (i) passed unconditionally or, (ii) for a conditional pass, satisfy all conditions set forth at the exam. You may make changes to satisfy the committee before initial submission to the thesis editor. You can take some time to do this but you should be aware of semester graduation deadlines *(above).*
- Iterate revised versions of your thesis with the thesis editor concerning the format. A final error-free thesis must be uploaded by a specific deadline. After that time, you must collaborate with your committee to obtain final approval by a specified deadline. This final version will be sent by the thesis editor, not you, to the committee members for final this approval.
- Graduate. To graduate in a given semester (fall or spring) you must pass your oral Unconditionally or satisfy all conditions and submit a draft of your thesis at least 6 weeks prior to graduation, and have your thesis approved by the committee at least 2 weeks prior to graduation. The exact dates for thesis deadlines are published in the academic calendar at the Graduate School web site.

For PhD students:
- Take seminar in 3rd semester (4th at the latest)
- Meet with committee at least once each year
- Continue coursework on Plan of Work (POW)
- Continue research
- No earlier than 4th semester take and pass a written Preliminary Exam that is put together by your advisory committee
- Prepare a written Ph.D. proposal that is submitted to your committee two weeks before oral exam.
- Take and pass an Oral Preliminary Exam (must be scheduled through Graduate Services Coordinator with 2 weeks' notice)
- Complete research
- Write dissertation
- Complete course work on POW
- Submit online Application for Graduation within first 6 weeks of semester that you anticipate graduation.
- Submit dissertation to committee two weeks before the final exam
- Take Final Oral Exam *(must be scheduled through the Graduate Student Services Coordinator with 2 weeks' notice)*
- Pass the oral exam. Your final semester of registration (usually MEA 899) is to be the semester during which your completed thesis or dissertation is submitted to the Thesis Editor. The procedures after this point are as for a M.S. thesis.
- Submit a PDF of a draft of your thesis to the thesis editor sometime after you have (i) passed unconditionally or, (ii) for a conditional pass, satisfy all conditions set forth at the exam. You may make changes to satisfy the committee before initial submission to the thesis editor. You can take some time to do this, but you should be aware of semester graduation deadlines.
- Iterate revised versions of your thesis with the thesis editor concerning the format. A final error-free thesis must be uploaded by a specific deadline. After that time, you must collaborate with your committee to obtain final approval by a specified deadline. This final version will be sent by the thesis editor, not you, to the committee members for final this approval.
- Graduate. To graduate in a given semester (fall or spring) you must pass your oral Unconditionally or satisfy all conditions and submit a draft of your dissertation at least 6 weeks prior to graduation and have your thesis approved by the committee at least 2 weeks prior to graduation. The exact deadlines are published in the academic calendar at the Graduate School web site.

Other Helpful Information:
New Student Survival Guide
Graduate Student Support Plan (GSSP)
Electronic Thesis and Dissertations (ETD)
Parking Permit Information
Establishing NC Residency
MEAS Graduate Student Association (GSA)
NCSU Graduate School

For more information on graduate programs, contact:
meas-grad-program@ncsu.edu
919.515.7776