

Department of Earth and Environmental Sciences
Graduate Program Guidelines
Updated May 2021

The Department of Earth and Environmental Sciences, like Syracuse University as a whole, is built around the two central goals of research and teaching. In order to fulfill this mission, graduate students gain experience and expertise in three areas integral to the degree program: 1) Research—formulating and carrying out new and independent research; 2) Communication—written and oral dissemination of results, including the ability to create posters, give talks, write abstracts, papers and proposals; 3) Teaching—most students will teach a recitation or lab, maybe even a lecture course, at least once during their time at SU. All three of these skills are critical to a career in the geosciences, whether you stay in academia or go on to industry. Even if you choose a field that does not directly involve teaching, everyone benefits from the ability to present information in a logical manner and develop a coherent argument that comes from teaching experience. Other attributes that are important during your time as a graduate student are the ability to network with other scientists in your area of expertise.

These departmental guidelines are a supplement to the Graduate School regulations and procedures, which can be found at <https://graduateschool.syr.edu/>. The requirements of the Graduate School, including deadlines, are the minimum for the University. Departments may, and often do, impose additional requirements or different deadlines than those of the Graduate School. It is the responsibility of the individual student to confirm that all appropriate degree requirements are met. The Graduate School forms and procedures are available online through the Graduate School's website. Please be sure to have the latest versions of these forms and procedures.

We strongly encourage you to retain a copy of each form that you complete. In addition, the Department keeps a student record for each student. It is essential that you send the Department Office (earadmin@syr.edu) a digital copy of documents that you complete as part of your academic endeavor. This is for your protection in case your official files are misfiled or otherwise mishandled.

All departmental forms referenced in these guidelines can be found on the Earth and Environmental Sciences Answers website: <https://answers.syr.edu/x/dMxfB>.

Table of Contents

1) Orientation	pp. 3
2) Initial Advising	pp. 3-4
3) Formation of Permanent Advisory Committee	pp. 4-5
4) Annual Report and Program of Study Requirements	pp. 5-6
5) Funding	pp. 6
6) MA Written Comprehensive Exam	pp. 6
7) Change in Degree Programs	pp. 7
8) Preparation of Thesis or Dissertation Proposal	pp. 7-8
9) The PhD Qualifying Examination	pp. 8-9
10) The Thesis (MS) or Dissertation (PhD)	pp. 9-10
11) Thesis or Dissertation Defense/Oral Examination	pp. 11
12) Appendix: Vancouver Protocol	pp. 12-13

Orientation

Graduate School Orientation: Each year prior to the start of the fall semester the Graduate School conducts an incoming graduate student orientation that is organized in two sections. The first section is for international students and the second section is for all students and centered around teaching assistantship (TA) duties. All incoming Earth Sciences graduate students are required to attend regardless of their funding in their first year with the Department. The opportunity to meet other students, explore the Syracuse area, and learn the TA teaching expectations at Syracuse University are an important first step in acclimating to campus and the community. In addition, a student's funding may change at any time during their tenure and having TA training from the beginning ensures that a student has multiple funding opportunities.

Department of Earth and Environmental Sciences Orientation: The departmental orientation program is typically conducted the week before classes begin in the Fall. This orientation is intended to provide students with initial advising and program of study planning, Department-specific TA training, driver safety, hazardous material chemical hygiene training, and a review of Graduate School and departmental academic rules and regulations.

Initial Advising

Upon matriculation, and typically during the week before fall classes begin, you will meet with a Temporary Advisory Committee (appointed by the Chair in consultation with the Director of Graduate Studies and your advisor) for an Advisory Review. The temporary advisory committee will typically consist of the Chair, Associate Chair or the Director of Graduate Studies, your advisor, plus one other faculty member with broad expertise in your field of interest for a committee size of three. The membership of your temporary committee will be chosen to reflect your interests, and you should consult with this committee when making academic decisions until a Permanent Advisory Committee has been selected. During the initial advisory review, the temporary committee will review your academic background, discuss your short-term and long-term goals, and help you with a suggested course of study for the first two or three semesters of your graduate study.

The Department values a solid background in the Earth Sciences, but also recognizes that Earth Science is an interdisciplinary field, and that applicants for graduate study may have an undergraduate degree in another related field (e.g., biology, physics, and engineering). While this diversity of expertise enriches us all, a certain amount of common knowledge and experience is necessary to maintain a cohesive and functioning graduate program and to provide high-quality instruction to undergraduate students in lab courses taught by TAs. To this end, we require incoming graduate students:

- to have taken, or to take during their first two years in residence, at least three distribution courses in the Earth Sciences, such as: Paleobiology, Sedimentology, Mineralogy, Structural Geology, Tectonics, Geochemistry, Geophysics, Climatology, Geomorphology, Paleo-oceanography, Paleoclimatology, Marine Geology and/or Hydrogeology; and
- to have successfully completed a full year (2 semesters) of Calculus (1 semester of which may be replaced with statistics, as applicable), Chemistry, and either Physics or Biology.

We also strongly encourage incoming students to have participated in a field course or comparable field experience, such as an NSF Research Experience for Undergraduates program.

Your background and coursework will be discussed with your advisory committee at the start of your graduate program to ensure that these requirements are satisfied. An advisory review checklist (Check Sheet for Initial Advisory Review form) will be completed and filed in the student departmental records. A transcript showing the successful completion of the required pre-requisite courses must be filed in the student's record in the Department.

Students desiring to take one of the above distribution courses that is only taught at the undergraduate level may complete a proposal for independent study (form available through the Registrar at <https://registrar.syr.edu/>) to take it at the graduate level where appropriate, and the advisor or instructor will provide extra work to warrant graduate credit. Such courses will typically be taken as “EAR 690: Independent Study,” with the expectation that the student complete all requirements of the course plus whatever additional work is deemed appropriate for a graduate student. For example, if a student needs to fulfill a physics PHY212/222 pre-requisite, the student will fill out the independent study form in conjunction with their advisor indicating that the nature of the experience would be to take PHY212/222 with additional graduate level work to be supervised by their advisor. The student would need to seek permission from the instructor of PHY212/222 (they would sign under faculty sponsor signature), their advisor, and the Department Chair. Once those signatures are obtained, the student submits the proposal to the Registrar, as per the instructions on the form. (The Department Office will have database access to the form, once approved by the Registrar). Note: The instructor may not approve the independent study. If this happens, one alternative is for the student to fill out a petition to faculty to take an undergraduate class as a graduate student. Such a request is also subject to instructor approval. An undergraduate course taken by a graduate student appears on the graduate section of the transcript. Although the course counts toward overall credit and GPA calculations on the transcript, an undergraduate-level course may not fulfill graduate degree requirements. Please contact the Director of Graduate Studies with any questions, concerns, or assistance that you need.

Formation of a Permanent Advisory Committee

When you have decided on a thesis or dissertation topic and selected an advisor, you form a Permanent Advisory Committee. A permanent committee should be formed by the end of the first year of graduate study towards a degree. In consultation with your advisor, students will select committee members who are well qualified to assist them in their research program. The membership of the Committee must be approved by the Director of Graduate Studies and the Department Chair. The committee works with the student in planning the degree program, primarily the research component, and should be kept informed of any changes in program of study (substitutions of courses, dropping courses, changes of research topic, etc.). A MS/MA committee must have at least three members including your advisor. A larger committee may be approved where appropriate. In addition, another fourth tenured or tenure-track faculty member, preferably from another department, must be added as the chair of the oral examination at the time of the MS oral thesis defense or written MA defense (see Academic Rules, section 31, Master’s Degrees at <http://coursecatalog.syr.edu/>).

A PhD committee will usually have five members including your advisor. At least two must be faculty members from the department. Normally, the advisor is the Chair of the Permanent Advisory Committee except during the candidacy exam and the oral PhD defense. Another member of the Permanent Advisory Committee (typically from the Department – see below), not the advisor, serves as the Committee Chair during the candidacy exam. A sixth member, a tenured or tenure-track faculty member of the SU faculty from outside the department, will serve as the exam chair at the time of the dissertation defense.

What constitutes an “outside” committee member? An outside committee member does not hold a tenured or tenure-track appointment at Syracuse University. A CV for a committee member from outside the University must be provided for the student’s file and Department Chair’s review. Additionally, if a PhD committee has more than one member from outside the Department, those external committee members must be approved by petition through the graduate school prior to the dissertation defense. Travel costs for external members of the permanent advisory committee are paid from the advisor's external research funds. While more committee meetings, examinations and defenses are now being undertaken using videoconferencing, face-to-face meetings are still considered more desirable.

The Permanent Advisory Committee will constitute the Examining Committee for the PhD qualifying exam. Note: The advisor cannot be the chair of the PhD qualifying exam. The chair of the PhD qualifying exam is typically a faculty member from the Department who is also on the advisory committee (see section 9 the PhD Qualifying Examination).

The Permanent Advisory Committee will constitute the committee for the final examination (MS or PhD thesis defense) or the MA final written examination. However, the advisor cannot chair the Examining Committee for a MS thesis defense—this is undertaken by an additional SU faculty member preferably from another department. In the PhD dissertation defense the chair of the committee must be a tenured or tenure-track Syracuse University faculty member from outside the Department (see Academic Rules, section 32, Doctoral Degrees at <http://coursecatalog.syr.edu/>). Note that the Graduate School does not assign examination chairs and it is the student's responsibility to identify an appropriate chair.

Students must complete the Formation of Permanent Graduate Committee form, obtain the signatures of all committee members (who thus commit themselves to serve), the DGS, and the Department Chair (who thus approve the committee). In rare cases the DGS or the Department Chair may call for modifications to the membership of permanent committees. The formation of a permanent committee does not require the approval of the Graduate School. The digital form must be filed in the student's record in the Department Office (earadmin@syr.edu) and the student should retain a copy and send a copy to their advisor.

Annual Report and Program of Study

Students turn in an Annual Progress Report at the end of the fall semester to the Director of Graduate Studies. (The report template is refreshed and recirculated annually by the Director of Graduate Studies.) The annual progress report provides students an opportunity to check their progress in the program related to course work, research, publications, etc. and seek guidance from their permanent advisory committee. This report is completed in conjunction with a meeting with the advisor and the advisory committee, prior to submission. The report is approved by the Director of Graduate Studies and is subsequently filed in the departmental file for the student. This report is cumulative starting with the first year and adding information each year until graduation.

Credit hour requirements of the graduate programs are as follows:

- The MA degree requires completion of 30 total credit hours of graduate course work, at least 12 of which must be at or above the 600 level.
- The MS degree requires completion of 30 total graduate credit hours, including 24 credit hours of graduate coursework plus 6 credit hours of thesis research.
- The PhD program requires completion of 48 total graduate credit hours. PhD students coming to the program with a MS may receive credit for up to 30 credit hours. An additional 18 credit hours are required. At least 12 of those 18 credit hours must be in graduate coursework, with the balance made up by dissertation credits. PhD students coming to the program without a MS must take at least 36 credits in graduate coursework. The balance of the 48 credits will be made up in dissertation credits.

PhD students coming to the program with a MS may receive credit for up to 30 credit hours from an accredited university (see Academic Rules, section 20, Transfer Credit at <http://coursecatalog.syr.edu/>). A formal University Petition to Faculty (available through the Registrar at <https://registrar.syr.edu/>) must be filed to have up to 30 credits formally credited. The student fills out the digital petition form, collects faculty advisor and Director of Graduate Studies signatures, and then forwards to the Department Office (earadmin@syr.edu) for submission to the Graduate School. If the student is transferring in their Master's degree (30 credits) then the petition does not need to be itemized. The language in the body of the form

should say something like: I respectfully petition to: “Have 30 credits from my master coursework from [blank] University transferred and applied to my Syracuse University PhD program of study”. If they are transferring in less than 30 credits, then they will need to submit an itemized petition for the courses to be transferred – listing the course titles, grades, credits, and semesters. In all cases, the final official transcript from the previous university showing the masters completed must be on file with the Syracuse University Enrollment Office (students must have official transcripts submitted directly to the Enrollment Office by the end of their first semester at SU as per Graduate School policy at <https://graduateschool.syr.edu/>).

A Program of Study form, an editable PDF which is available from the Graduate School at <https://graduateschool.syr.edu/>, summarizes the coursework you have completed during your graduate program and is required for graduation upon completion of your program. Graduate students will start developing this form at the initial advisory committee meeting. Each year the individual student will submit an Annual Progress Report (see above), which will include an updated Program of Study form. Note that you do not have to submit this form to the Graduate School until the year you plan to graduate and after you have completed all your program credit requirements. Prior to the thesis or dissertation defense/oral examination, and with the advice and concurrence of the faculty advisor and the Department Chair, the student will file the completed Program of Study form with the Graduate School (facilitated by the Department Office). The student is responsible for the completion of the digital form including securing appropriate signatures. The completed Program of Study form should be filed in the Department Office (earadmin@syr.edu) five weeks prior to the anticipated defense date. The Department Office will forward the completed form to the Graduate School for processing. Note: Total credits reflected in the Program of Study must total (but not exceed) the total required credits for your program. Only include courses and credits that are required for your program (even if you took additional, supplemental courses during your time in the program).

Funding

Graduate students are offered the following amounts of support, given satisfactory progress each year:

- MS student - 4 semesters
- PhD student - 8 semesters

A student on a full academic year TA or RA are eligible for tuition waiver of 9 credits in the fall semester, 9 in the spring semester, and 6 in the summer - for a maximum of 24 in one academic year.

Funding for Research Assistantships is usually arranged by the faculty advisor, but graduate students are strongly encouraged to seek their own supplemental funding by searching the databases located online at the Office of Sponsored Programs (<https://sponsoredprograms.syr.edu/>). PhD students in their first year of graduate study, or those in the final year of writing, may also be eligible for fellowships sponsored by NSF, NASA or other agencies, and students are strongly encouraged to explore all of those opportunities.

MA written comprehensive exam

Upon, or very near to completion of 30 course credits, a MA student will undertake a comprehensive written exam. The student’s advisor and the two permanent committee members will each submit a question to the chair of the exam: an appointed Earth and Environmental Sciences faculty member. The exam chair will be selected by the chair of the department in consultation with the advisor and the Director of Graduate Studies. The questions will test the student’s knowledge to a MA level, on general earth sciences topics, but also taking into account any specialist knowledge the student may have. The student will have one week to complete written answers to the three questions which will each be no more than ten pages (12 point, Times New Roman, 1” margins. 1.5 spacing) exclusive of diagrams and references. The student submits answers to the chair of the exam, these are read by the chair, the advisor and the committee who vote to pass or fail. More than one negative vote constitutes a fail. In the case of a fail, the committee may

offer one additional exam question, same format, to be completed in one week. If the student fails that written exam (more than one negative vote constitutes a fail), the decision is final. If the student passes that final question, then a positive result is recorded and the student is recommended for a MA degree.

Change in Degree Program: Changing from a MS to a PhD

If a student is initially admitted into the Department as a MS student, but subsequently wishes to change to a PhD student, the student should discuss this with their advisor and advisory committee. The Department requires a student to make a formal request (a letter) to the faculty to change from a MS to a PhD. The student's advisor also writes a letter of support. This formal request is discussed at a faculty meeting and a decision made. Subsequent to an affirmative decision by the Earth and Environmental Sciences faculty, the required Graduate Program Transfer form (which can be found through the Graduate School at <https://graduateschool.syr.edu/>) must be completed in digital form and submitted to the Director of Graduate Studies. The Director of Graduate Studies will fill out the Department section, acquire the Department Chair's signature, and turn into the Department Office (earadmin@syr.edu) which will in turn submit to the Registrar for processing. A digital copy is retained in the student's departmental record. (See Academic Rules, section 29, Internal Transfer at <http://coursecatalog.syr.edu/>).

Preparation of Thesis or Dissertation Proposal

All MS and PhD degree students are required to write a thesis (MS) or dissertation (PhD) proposal. Because the MA is a non-thesis degree, proposals are not required. Thesis or dissertation proposals should be written as early in the degree program as possible.

MS students should write their thesis proposals in the second semester, but certainly not later than the start of the third semester, of their graduate degree programs.

The PhD dissertation proposal serves as the vehicle for the PhD Qualifying Examination. Because PhD students are required to take the Qualifying Examination no later than the fourth semester of their degree program (see below under Examinations), it follows that the dissertation proposal must be written by the fourth semester. Students who do not complete research proposals in a timely manner may jeopardize continued departmental funding.

Thesis or dissertation proposals should clearly state the nature of the scientific problem to be addressed, the approach to be used in solving the problem, and methods to be used (analytical, observational, statistical, etc.). Proposals should be concise; MS thesis proposals are typically 5-10 pages but should not exceed 10 pages. PhD dissertation proposals may not exceed 15 pages of text. Text is defined as 12 point, Times New Roman, 1.5 spaced, with margins of 1 inch, and exclusive of figures, tables, references, etc. The Department keeps a record of previous research proposals; these can be used as examples. Forms and templates, including sample cover pages, can be found here: <https://answers.syr.edu/x/dMxfB>.

The proposal must be approved by the advisor following a series of reviews and revisions. It is advisable to establish a timeline for completion of the proposal and maintain regular contact with committee members to ensure that their comments and concerns are addressed in a timely manner. Note that reading, editing, and commenting upon thesis and dissertation proposals is a responsibility of faculty members, and students should not hesitate, after a suitable interval of time (~10 business days), to ask their committee members about the status of their proposals.

Thesis or dissertation proposals should be prepared in consultation with the advisor. The general procedure for circulating and approving the research proposal is as follows:

- When the research supervisor is satisfied with the proposal, he or she will indicate to the student that the draft should be circulated to the other members of the committee.
- The proposal may then be circulated to the other members of the permanent advisory committee for their comments.
- When comments from the advisory committee have been compiled, the student should consult with the advisor on the final form of the proposal.
- All members of the advisory committee, including the advisor, must sign the cover sheet of the final proposal when they are satisfied with it.
- The proposal (both MS and PhD) is then dated (date of circulation) and converted to PDF or other digital format. The student will circulate an email notification (attaching the proposal) to the faculty and the Department indicating that the thesis proposal is available for review. Sample email notification templates, and many other departmental forms, can be found here: <https://answers.syr.edu/x/dMxfB>.
- Faculty (or other interested parties) have one week from the date of circulation to object to the proposed work, *in writing*, to the Department Chair.
- If no objections are received, the proposal is approved and will be signed by the Departmental Chair and the DGS. The fully signed digital PDF copy should be sent to the Department Office (earadmin@syr.edu) and will be retained in the student's departmental file.

The PhD Qualifying Examination

This requirement satisfies Academic Rules, section 32, Doctoral Degrees at <http://coursecatalog.syr.edu/>.

The PhD Qualifying Examination is a departmental examination that must be taken by PhD students no sooner than the beginning of the third semester and no later than the end of the fourth semester. The examination is scheduled only after a Dissertation Proposal has been approved and cover page and proposal filed in the student file.

If the PhD student does not have a prior MS degree and is therefore seeking to complete 36 credits of coursework rather than the 12 credits required of a student entering the program with an MS, he or she may seek an extension by petitioning the faculty. In this case, he or she should plan to take the PhD Qualifying Examination not sooner than the beginning of the fourth semester, nor later than the end of the fifth semester.

The examination is oral and is based upon the Dissertation Proposal that serves as a vehicle for a broadly based examination. Recall that the chair of the qualifying exam is typically a faculty member from the Department who is also on the advisory committee; the student's advisor cannot be the chair of the qualifying exam. The examination is not a "defense" of the proposal. Rather, the aspirant makes an oral presentation of the proposal that lasts about thirty minutes. Following this, the Examining Committee (the Permanent Advisory Committee) will examine the aspirant on various subjects that are germane to the proposed research. The examination is designed to determine whether the aspirant has the research skills, appropriate conceptual abilities, and background knowledge to carry out advanced scientific research. Any subject matter, including basic earth science knowledge, which may be related to the proposed research, is "fair game" for questioning. However, aspirants will not be asked questions that are unrelated to the proposed research.

All faculty members are invited to attend the examination presentation, but if they wish to attend or participate in the questioning, they must remain until the examination is completed and participate in the Committee's discussion of the outcome. Only the Examining Committee, however, votes on the outcome. The result of the examination shall be Pass or Fail. More than one negative vote constitutes failure of the examination. Should the Examining Committee decide that the results of the oral examination are inconclusive, it may schedule a written examination to be taken within one week of the oral examination; in this case, the committee vote may

be deferred until evaluation of the written examination is completed.

Students who pass the Qualifying Examination and have completed their necessary coursework credit hours are advanced to "Candidacy for the PhD Degree" assuming that all requirements are met except the dissertation and oral examination (see Academic Rules, section 32, Doctoral Degrees at <http://coursecatalog.syr.edu/>). If the student fails the examination, one additional attempt may be made, but not sooner than three months after the initial attempt.

If the examination is not passed on the second attempt, the student's doctoral program will be terminated. Examining Committees also have the option to grant a "Pass" that is conditional upon limited additional course work, reading, etc. and may require a further committee examination or review of such additional work. If this is the case the committee will reconvene at the appropriate time to discuss whether the student has met the additional requirements. The limited additional requirements undertaken by a student to proceed to PhD candidacy should a pass be conditional shall be accomplished within six months of the examination. A committee may also recommend that the student undertake a MS degree should he or she not perform well in the PhD qualifying exam. Note that a "conditional pass" in the PhD qualifying exam does not constitute a pass for the purposes of applying for University Fellowships (for example) that may be available for PhD candidates.

Documentation Requirements

The student must inform the faculty and Department Office of their qualification exam date and location two weeks in advance. This notice will be by email. Sample email notification templates, and many other departmental forms, can be found here: <https://answers.syr.edu/x/dMxjB>. The chair of the examining committee (usually a faculty member from the Department who is also on the advisory committee) shall complete the Qualifying Examination Disposition form, and send it to the faculty of the Department of Earth and Environmental Sciences following the examination. The digital form (and accompanying memo, if appropriate) is also sent to the Department Office (earadmin@syr.edu) for submission to the Graduate School Certification Office and filing in the student's departmental record.

Note: Academic Rule, section 32 at <http://coursecatalog.syr.edu/> states: *"If the student has exceeded the seven-year limit for achieving ABD status, the student must register for GRD 991, which requires a minimum of one credit hour per semester, each fall and spring semester until ABD status is achieved. If the student fails to register for GRD 991, for a given term, the student will be withdrawn from the program. If the student has exceeded the degree completion limit of five years after achieving ABD status, the student must register for GRD 991, which requires a minimum of one credit hour per semester, each fall and spring semester until the completion of the doctoral degree. If the student fails to register for GRD 991, for a given term, the student will be withdrawn from the program"*

The Thesis (MS) or Dissertation (PhD)

The thesis (MS) or dissertation (PhD) is the written presentation of research accomplished. The research phase of a graduate program is generally the most exciting and productive part. Research by graduate students is normally done in close consultation with the faculty advisor and often members of the Advisory Committee. Research studies vary widely because of the breadth and interdisciplinary nature of Earth science. However, the Department expects that all research done by its students will be of the highest quality, involving careful study of significant scientific problems while adhering to ethical standards.

The Department of Earth and Environmental Sciences encourages MS and PhD candidates to prepare theses or dissertations in a format that is suitable for publication in a peer reviewed journal and will accept manuscripts that constitute one or more articles ready for submission to journals. Theses or dissertations may

also be submitted in a standard, or traditional, format. The number of articles (for peer reviewed journals of international merit) required for the thesis or dissertation will depend upon the subject studied. One journal article manuscript is typically required for the MS thesis and three journal article manuscripts are typically required for the PhD dissertation. PhD dissertation with three papers typically have short introduction and conclusion chapters that introduce and explain the theme of the research and the combined conclusions and implications of the research. The format of the thesis or dissertation must be approved by the Advisory Committee and the Director of Graduate Studies.

Graduate School Procedures: MS theses and PhD dissertations must comply with the general requirements of the Graduate School. Students who are approaching the final stage of their programs should review the materials provided by the Graduate School at <https://graduateschool.syr.edu/> including the dates and deadlines, requirements for commencement, the thesis/dissertation defense checklist, and the dissertation submittal checklist. Students are responsible for reviewing and following the procedures and policies given by the Graduate School.

Specifics of Doctoral Dissertations and Master's Theses Format: Information related to the formatting of theses and dissertations can be found through the Graduate School at <https://graduateschool.syr.edu/>. Dissertations that are tabled for defense must be in the approved format.

Vancouver Protocol: The Department of Earth and Environmental Sciences endorses and follows the guidelines of the Vancouver Protocol on research policy and authorship. Important components of the Protocol that are particularly relevant to the Department are summarized at the end of these guidelines. The master document can be found at <http://www.icmje.org/>.

The Writing and Approval Process and Timeline: Students, particularly for the PhD, may write their dissertation incrementally over time, particularly if they are preparing a series of journal manuscripts that will ultimately be compiled for the dissertation. Such development of the dissertation or thesis over time is preferable to trying to write the entire document at the end of the program. With that in mind, the writing and approval process, even for one individual journal article manuscript, may take more than six months after completion of the first draft!

More time may be required if your writing skills are still being honed or if you write primarily during the summer, when faculty may be away from the Department doing field work or other research work. It is paramount that students communicate clearly with their advisor regarding the expectations of how long it will take for the advisor to review drafts of the thesis or dissertation chapters and return comments. It is in the best interests of the student to have this documented in email correspondence. Some advisors prefer to see an entire draft, complete with figures and tables, and some prefer to see sections of the manuscripts as they develop.

The general steps for approving the thesis or dissertation for the oral defense are:

- The student and advisor should discuss ideal defense dates keeping in mind that, conservatively, the student should count backwards at least six weeks from that date to have a complete draft ready to circulate to their committee.
- Advisor and student exchange drafts of the thesis or dissertation until the advisor considers the document ready for defense. This process can take months and should be planned carefully between the advisor and student.
- Once the advisor approves the text, figures, tables, etc., and considers them to be in final form, the student sends a digital copy of the final document to his or her committee members for approval. In general, committee members should evaluate whether the document is ready for defense within two weeks, although detailed comments may not be provided until the actual defense date. When the

committee agrees that the document is ready for the defense, they sign a preliminary cover page indicating their approval. Sample cover pages, and many other departmental forms, can be found here: <https://answers.syr.edu/x/dMxfB>.

- The final “defense version” of the thesis or dissertation, as approved by the advisory committee, is then given in hardcopy to the Department Office for public viewing. Note that the student must submit copies of the final completed thesis/dissertation in the appropriate form to all members of the examination committee, including your advisor and the chair of the oral examination, **at least two full weeks before** the scheduled date of the examination. This is a Graduate School requirement, and this deadline is strictly enforced. The defense version of the thesis or dissertation must be available for public viewing at least two weeks (14 days) prior to the defense date. Also, not later than three weeks prior to the defense date, the student also submits a formal request to schedule the exam date through the Graduate School at <https://graduateschool.syr.edu/>.
- The student sends an email notification to the entire Department two weeks in advance of the oral examination/defense, indicating the advisor and committee has approved the thesis or dissertation for defense and it is available for public viewing. Students should attach to the email notification the digital version of the thesis or dissertation (including preliminary cover page). Sample email notification templates, and many other departmental forms, can be found here: <https://answers.syr.edu/x/dMxfB>.

Thesis or Dissertation Defense: The Graduate School has very specific procedures that must be followed to obtain clearance to schedule a thesis or dissertation defense (e.g., the oral exam). It is important that students review and follow those graduate school policies and procedures. Please refer to the Graduate School regulations, which are available at <https://graduateschool.syr.edu/>. Note that if a PhD committee has more than one member from outside Syracuse University, those external committee members must be approved by petition through the Graduate School prior to the dissertation defense (usually at the time the permanent committee is formed). The following information is additional departmental requirements and explanations.

One week prior to the defense, the student creates a letter size poster (portrait orientation) announcing the title of the thesis, your name, date, time, and place of the defense. The poster is then posted around the Heroy Geology Laboratory. A sample is included here: <https://answers.syr.edu/x/dMxfB>.

Defenses of theses and dissertations are public events in which the student presents the results of his or her research and then answers questions. The chair of the examining committee typically explains the rules of the exam to the audience prior to the exam starting. Typically, the advisor introduces the defending student.

The normal format is a presentation lasting thirty to forty-five minutes. The floor is then opened to questions from the audience. Normally, the Examining Committee does not ask questions at this time. After the general audience has asked questions, it will be excused and the Examining Committee will ask questions of the candidate to elucidate any aspects of the research it deems necessary. For both MS and PhD candidates, the Defense is a final examination. Questioning by the Examining Committee generally lasts about two hours but may go longer.

In addition to the Graduate School requirements (<https://graduateschool.syr.edu/>), a digital copy of the final version of the thesis or dissertation must be provided to the Department Office (earadmin@syr.edu).

Appendix: Vancouver Protocol

(Note that this is summary of the full Vancouver Protocol that was originally written for the medical field but has been summarized and also edited for relevance to the Department of Earth and Environmental Sciences). Various copies of the full protocol are available on the internet including:

<http://www.icmje.org/recommendations/browse/roles-and-responsibilities/defining-the-role-of-authors-and-contributors.html>

1 Objectives

1a: The Protocol aims to provide an understanding of the qualifications for authorship and the responsibilities of each author for a submitted manuscript or a presentation at a conference.

1b: The guidelines also ensure that the contributions of students and staff (or others) who participate in research activities leading to publications are acknowledged in a fair and proper manner.

1c: To provide a basis for the order of authorship in multi-authors papers or presentations.

2 Qualifications for authorship

2a: Qualification for authorship requires substantial participation in a research project. The following conditions must all be met:

2a (i) conception and design, or execution, or analysis and interpretation, of at least part of a research output in the author's field of competence

2a (ii) drafting at least part of the article or revising it critically for important intellectual content

2a (iii) participation in approval of the version to be published

2b: Any author, regardless of order of authorship must be able to take scholarly responsibility (inside and outside the University), for at least that part of the output in the person's area of competence.

2c: Some contributions to the research will not qualify for authorship but should be recognized in the "acknowledgement" section, or elsewhere in the paper/presentation. Examples of these contributions may include: designing and maintaining apparatus, statistical advice, data collection only, administrative support and data entry, scholarly advice, conducting interviews, translation and transcription, providing only physical resources or funding, leadership or membership of a research entity under which the research was carried out without fulfilling 2a(i) or 2a(ii). Initialization or conceptualization of the original idea upon which the research was based without fulfilling 2a (i) or 2a (ii).

2d: No-one can be included as an author, or acknowledged for a contribution, against their wishes.

2e: Authorship (especially the order of authors) can often be a delicate subject. Thus, authorship as part of a research project should be discussed at a relatively early stage, and reviewed when there are changes in scope or involvement in a project.

2f: The first or primary author usually writes the first draft of a research paper or other research product.

2g: Qualification for authorship is usually decided by the other authors. This applies to whether paid consultants to a research team should be authors.

Common practice is that consultants who contribute substantially to the intellectual research output are included as authors. However, consultants who do not contribute in a substantial way or who contribute only through data collection or analysis, but not to the intellectual part of the research are not normally included as authors, but are acknowledged.

3 Authorship order

3a: The order of authorship is usually decided by intellectual contribution, with the researcher making the largest contribution being the first author, or to select where they want to be in the list of authors.

3b: The order of other authors in a multi-author publication is also decided by their relative intellectual contribution, although discipline-specific variations also determine authorship order (e.g., alphabetical after the major contributors, the research advisor is added last - provided they meet the criteria of 2a (i) and 2a (ii)).

3c: Authorship order should be negotiated between authors, but usually the first author plays a lead role in

determining order.

3d: Authors in a multi-author publication may choose to simply list authors in alphabetical order or honor a particular author by placing them first.

4 Graduate students as authors

4a: If based upon the research conducted for a PhD or MS, the student usually qualifies as the primary (first) author. It is regarded as unusual is a graduate student who fulfills the requirements of a MS or PhD and is awarded that degree by a university would not fulfill the requirements to be the first author.

4b: For MS degrees that involve coursework and a research report for MS, honors and undergraduate research projects, the student may or may not be the primary author; this depends on the relative intellectual contribution to the final product. It would be possible for a student, particularly an undergraduate student to collect data, but not be able to meet 2a (i) and 2a (ii) and hence lose their entitlement to authorship.

4c: Usually, the results of research undertaken by a student (graduate or undergraduate) are not submitted for publication until there has been interaction with the student's advisor.

4d: If the student's advisor fulfills the criteria of 2a(i) and 2a(ii) above (with respect to a student's research project) and the student fails to publish within a reasonable time period (usually 2 years since graduation), then the advisor will have the right to publish the findings as first author.

5 Multi-institution involvement in publication

5a: If multiple institutions (universities, government research organizations, institutes in other countries) pay careful attention to 2e.

5b: Most, if not all reputable institutions and universities subscribe to the Vancouver Protocol, therefore it should be unlikely that disagreements arise as to qualification or order of authorship.

If disagreements do arise, then the guidelines of the institution of the first author usually apply. If disagreements cannot be amiably settled, then these are referred to the Vice- Chancellor for Research (Provost) for discussion with their counterpart(s) at the other institutions.

6 Author obligations

6a: Each author has the obligation to ensure the authenticity and accuracy of the research output and publication content, at least in their area of expertise.

6b: Should a research product or publication prove to be fraudulent (which brings the university into disrepute), the university considers all authors to be liable, until shown otherwise. Primary or first authors are under a greater obligation and will carry a greater burden of responsibility.

6c: Selection of research publication. Be aware that copyright usually passes to the publisher of a research output and that the publisher may have their own set of rules (e.g., all author lists are alphabetical) which may override the wishes of you and your co- author.