



The Academic Policy Handbook
(Graduate Student Information)

DEPARTMENT OF EARTH
SCIENCES

Dartmouth College
Hanover
NH 03755

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This document is intended to clarify how the Department of Earth Sciences (EARS) implements the degree requirements defined in the Dartmouth College Bulletin of Organization, Regulations, and Courses (ORC). **The ORC is the authoritative document that defines the degree requirements. If the ORC and this document are in conflict, the ORC supersedes this document.**

In addition, the policies implemented by the Guarini School of Graduate and Advanced Studies (hereinafter the Guarini School) apply to all the graduate students in the Earth Sciences graduate program and students are referred to appropriate documents published by the Guarini School on their website (<https://graduate.dartmouth.edu/academics/graduate-school-forms/academic-policies>).

The EARS Department Graduate Coordinator and Chair read, update and approve this document each year based on faculty discussions and voting throughout the year.

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Summary of key dates

Important dates for MS candidates

Year 1	April 1st Submit names of committee members to the Graduate Coordinator	June 15th Submit thesis proposal signed by committee to the Graduate Coordinator
Year 2	Late April/Early May Get thesis committee approved by the Guarini School	Prior to Scheduling Defense Get Degree Certification form signed by the Graduate Coordinator

Important dates for PhD candidates

Year 1	April 1st Submit names of summer research committee members to the Graduate Coordinator	June 15th Submit summer research proposal signed by committee to the Graduate Coordinator, receive literature papers for qualifying exam from committee
Year 2		Prior to Feb. 1st Present and defend results of summer research project, complete oral qualifying exam
Year 3	Prior to Dec. 15th Present and defend a thesis proposal	Prior to Feb. 1st Get thesis committee approved by the Guarini School Prior to Mar. 1st Submit copy of thesis proposal signed by committee to the Graduate Coordinator
Year 4/5	Prior to June 1st Yearly committee meeting-20 min. presentation. Submit summary paragraph signed by advisor to the Graduate Coordinator	Prior to Scheduling Defense Get Degree Certification form signed by the Graduate Coordinator

Guarini School Deadlines

Term	Signed thesis to Guarini by:	To graduate on:
Summer	15 August	15 September
Fall	1 October	3 November
Winter	1 February	2 March
Spring	15 May	9 June

1) General information regarding advanced degrees in the Earth Sciences

- a) Degrees offered:** The EARS Department awards both M.S. and Ph.D. degrees in Earth Sciences.

The M.S. and Ph.D. degrees alike require a solid background in the Earth sciences. Accordingly, many aspects of curriculum and committee selection, as well as academic requirements and regulations given below, apply to both degrees. The main differences between the degrees are the scope and depth of the thesis investigation, depth of knowledge in the disciplines that most closely relate to the thesis, and level of independence in carrying out the research.

- b) Expectations of publication:** Both the M.S. and Ph.D. degrees at Dartmouth require a written thesis. The M.S. degree is a professional degree, and the M.S. thesis is expected to report on research that is ultimately worthy of peer-reviewed publication. A Ph.D. thesis is expected to report on research worthy of three or more peer-reviewed publications, the majority of which should be published or in review/revision by the time of completion of the Ph.D.

- c) Grading in graduate courses:** The following grades are used in graduate-level courses: HP (high pass), P (pass), LP (low pass), and CT/NC (Credit/No Credit). Credit/No Credit is assigned for EARS 141-143 (thesis research), EARS 145 (field instruction), and EARS 149 (undergraduate teaching). Consult the ORC for explanations of these grades. When graduate students take undergraduate courses, passing grades of C+ and lower will be considered a low pass. If a student receives two low passes, their status in the program will be reconsidered, and dismissal from the graduate program is an option. In general, if a graduate student fails to meet the program key deadlines or fails consistently to make reasonable progress toward completion of assigned research and coursework, they may also be subject to dismissal from the graduate program.

2) Advisory committee, course registration and enrollment, and courses outside of Dartmouth

- a) Initial advising:** At the beginning of fall term, first-year graduate students meet individually with their academic advisor to discuss their individual course of study for the year and beyond. The graduate school requires that a student always have a thesis committee. Until a graduate student's regular thesis (or summer research) committee is named during the spring term of the first year of residency, the Graduate Coordinator and Chair will serve as

default members of the committee and will be available to the graduate student for academic advising. In the case that the advisor also serves as either the Graduate Academic Coordinate or Department Chair, the Graduate Liaison will serve as a member of the committee.

In preparation for the initial meeting with one's advisor to identify a tentative course schedule, each student is encouraged to fill out the Departmental curriculum form attached at the end of this document, listing college-level science courses one has completed and the courses one proposes to take during the next two academic years. The student should consider what courses previously taken may be used to fulfill program prerequisites and requirements.

Whether a course taken elsewhere can be used to fulfill program prerequisites and requirements is determined by the Prerequisite Committee, which consists of three EARS faculty members. No course taken elsewhere may count toward program prerequisites or requirements unless approved by the Prerequisite Committee. In determining if a course taken elsewhere can fulfill program prerequisites or requirements, a student may be required to provide a copy of the course syllabus. The determination of whether courses taken elsewhere will count toward prerequisites and requirements should be made during the first term a graduate student is in residence.

- b) Change in academic advisors:** A student may request a change of academic advisors at any time; this request should be made in writing to the Graduate Coordinator or Chair. This change is dependent on advisor availability, current advising load, and funding, and is granted only if all parties involved agree to the proposed changes.

- c) Registration/enrollment requirements:** Graduate students must enroll for three academic credits each term. These credits may include EARS 141-143 (thesis research), EARS 149 (supervised teaching) and EARS 145 (supervised field instruction). Note that EARS 142 is equivalent to two course credits and EARS 143 equivalent to three course credits. When enrolling in thesis research, students should choose only one of EARS 141-143. Thus, a student taking a graduate seminar (e.g., EARS 201) and spending the rest of their time doing thesis research would enroll in EARS 201 and EARS 142. Similarly, a student doing full time thesis research need only enroll in EARS 143.

Specific coursework requirements are outlined in **section 3**. Otherwise, there is significant flexibility and available time for students, in consultation with their advisor and thesis committee, to customize their own graduate training. In addition to departmental offerings, the EARS faculty recommends that students consider relevant courses in the Departments of Mathematics, Chemistry, Physics and Computer Sciences, as well as in the Thayer School of

Engineering. Course offerings from these departments are described in the ORC and on respective Departmental websites.

Overall, foresight and prior thought are necessary when considering which Dartmouth courses to take: many upper-level courses eligible for graduate credit offered within the EARS Department and elsewhere on campus are normally offered only in alternate years. Thus, we suggest that each student develop a tentative graduate curriculum that spans two full years, at a minimum.

- d) Courses outside Dartmouth:** The EARS faculty recognize that there are many professionally rewarding and research-relevant short courses and full-term courses offered elsewhere that can complement our own course offerings. The EARS faculty are willing, on a case-by-case basis, to provide financial support for up to a maximum of \$1,000 associated with enrollment and travel in such off-campus courses. The remainder of the costs should be covered by the advisor and/or additional funding sources. A student's request for such support will include a written justification for this amount, including a description of the course, and at least one letter of support from the student's primary advisor and/or members of the student's research committee. The department will only provide funding for one course outside Dartmouth per student per degree.
- e) Leave of absence:** A student undertaking a full-term course (or other pursuit) outside Dartmouth must apply to the Guarini School (through the Graduate Coordinator) for a leave of absence. Such leaves are generally approved only after a student has completed three consecutive terms on campus. During a leave term, a student is generally not paid and is responsible for their own health insurance fee (insurance must be maintained while on leave).

If the student's schedule elsewhere permits the registration for EARS 142 at Dartmouth (i.e., there is sufficient time beyond the external work to conduct 2 credits worth of independent research), no leave of absence is required.

- f) Employment outside Dartmouth:** The policy for compensated work outside of the EARS Department is governed by the Guarini School and articulated in the Guarini School Academic Policies: <https://graduate.dartmouth.edu/policy/employment-policy>. This policy states that students who are receiving a full TA or RA stipend cannot receive additional payment from Dartmouth College for services rendered and cannot accept employment outside the College while enrolled. Exceptions to this policy may be granted in the case of demonstrated career benefit or financial hardship and will not normally exceed 8 hours per week. See the Guarini policy for more details.

3) Requirements and guidelines - all degrees

- a) **Prerequisites for all degrees:** To be considered for admission to the Earth Sciences graduate program a prospective student must have completed an undergraduate science major with broad background in Earth Science, for which the coursework should have included the following:
- i) The equivalent of Dartmouth courses **Math 3 and 8.**
 - ii) The equivalent (or higher level) of any two of the following Dartmouth course sequences:
 - (1) **Chemistry 5 and 6;**
 - (2) **Physics 3 and 4 (or 13 and 14);**
 - (3) **Biology 11 and 16**

If a student is admitted into the graduate program without having completed such courses, the student must fulfill these prerequisites in addition to the specific degree requirements described below. Courses taken to satisfy the EARS graduate program prerequisites do not count towards the courses required for M.S. or Ph.D. degrees. The following are additional ways that students can satisfy these prerequisites.

- AP Credits: An AP Chemistry or Physics exam with a score of 5 and/or AP credit given at the student's undergraduate institution will count for the first course of the two-course sequence - i.e., Chemistry 5, Physics 3.
- Upper-Level Courses Taken at Dartmouth and Elsewhere: If a student takes or has taken an upper-level Chemistry, Physics or Biology course that requires one of the courses above as a prerequisite, that course can be substituted for a lower-level prerequisite course on a 1:1 basis for courses taught in the same department. For example, if a student takes CHEM 75 (Physical Chemistry 1) which has a prerequisite of Chemistry 6, then CHEM 75 can fulfill the Chemistry 6 requirement.
- Upper-Level EARS Courses: Of the four required courses above, one course in a given two-course sequence for subject X can be replaced by an upper-level geo-X course in the same subject taken at Dartmouth. This is typically the second course of the two-course sequence. Specifically, EARS 162 (Geochemistry), EARS 173 (Environmental Isotope Geochemistry), and EARS 174 (Soils and Aqueous Geochemistry) may be taken instead of the second chemistry course. EARS 164 (Geophysics) and EARS 174 (Geomechanics) may be taken instead of the second physics course. EARS 172 (Geobiology) may be taken instead of the second biology course. As noted above, if an upper-

level EARS course is used to satisfy a prerequisite, it cannot also count towards the M.S. or Ph.D. degree requirements.

- b) **Required core curriculum for both M.S. and Ph.D.** All first-year graduate students are required to enroll in **EARS 201, 202 and 203** in sequence, offered in fall, winter and spring terms each year, respectively. These courses provide an opportunity to build a spirit of collaboration among the members of an incoming cohort, as well as an introduction to regional New England geologic history and the development of critical professional skills, including pedagogy and science communication. In special cases (required field seasons during one of these terms, for example), one or more of these courses may be delayed to the second year.
- c) **Per Guarini School requirements, each graduate student is required to participate in Professional Ethics training.** This training includes a panel discussion during the Guarini School orientation. It also entails meeting with trained ethics facilitators for four sessions. The EARS department has incorporated this training into EARS 201 and expects that all students will attend the ethics sessions in EARS 201.
- d) **Each graduate student is required to TA at least one course during their graduate degree.** An essential element of graduate education at Dartmouth is the experience gained in teaching other students; this expectation acknowledges that aim. To fulfill this requirement, the student must be enrolled in either EARS 145 or EARS 149 during one term in which the student serves as a TA.
- e) **Each graduate student is required to complete CPR/First Aid training.** The EARS department requires all graduate students to complete first aid training, ideally in the first year of their graduate degree. Graduate students are strongly encouraged to complete a Wilderness First Aid (WFA) course and the department will organize and support this course for all graduate students. There are also opportunities to take CPR/First Aid classes through Dartmouth EMS (<https://sites.dartmouth.edu/dems/community-training/cprfa-classes/>). Students who are TAs on the Stretch are required to have WFA certification prior to going on the Stretch.
- f) **Each graduate student is encouraged to be certified to drive Dartmouth College vehicles including vans.** Some graduate students will drive vehicles for class and department field trips or events. To drive Dartmouth College vehicles, students need to be certified through Dartmouth Transportation Services (https://www.dartmouth.edu/transportation/driver_safety_program/approval_process/index.php). Students who are TAs on the Stretch are required to be certified to drive Dartmouth College vehicles prior to going on the Stretch.

g) Each graduate student is encouraged to complete an Individual Development Plan (IDP) annually.

An IDP is useful for articulating and accomplishing course and research goals, assessing communication between a student and an advisory committee, and promoting overall well-being and success in the program. An IDP form will be provided to each graduate student by their advisor annually. After the form is completed by the student and advisor, they should meet and discuss the form.

h) Specific requirements - M.S.

i) EARS 117 or 118

ii) Two additional courses carrying graduate credit. Of these, one may be from the EARS 270–279 series (topical literature). Courses not eligible for course credit toward a graduate degree include special project research (EARS 131), thesis research (EARS 141-143), supervised field instruction (EARS 145), and undergraduate teaching (EARS 149). With approval from their thesis committee, an M.S. student may transfer no more than 1 course credit from another institution to count toward fulfilling these requirements.

iii) Complete the equivalent of three terms (nine course credits) of thesis research for registered credit (EARS 141-143). See **section 2c** for additional details regarding EARS 141-143.

iv) Submit names of the thesis committee. Additional information on committee membership is given in **section 4**. This should be completed by April 1st of a student's first year.

v) Submit a thesis proposal. The submitted thesis proposal must be signed by all members of one's committee, signifying their approval. This document should be prepared in close collaboration with one's research advisor. This should be completed by June 15th of a student's first year.

vi) It is expected that, at a minimum, a student will meet with the Dartmouth members of their committee at least once during the winter term of their 2nd year to give a 20-minute presentation on the progress of their research. After this presentation, the committee will discuss the student's progress and determine what is required to ensure that they maintain satisfactory progress. It is the graduate student's responsibility to prepare a short summary of this meeting, and submit a copy, signed by the student and their advisor, to the Graduate Coordinator.

vii) Obtain thesis examining committee approval by the Guarini School. Submit to the Guarini school a completed "Master's Examination Committee Approval Request" form, available on the Guarini School

“Thesis and Dissertation Forms” webpage. This must be completed well before scheduling your thesis defense, and requires signatures from your advisor, the EARS Graduate Coordinator, and the Guarini School.

viii) **Complete a thesis of professional quality.** A near-final draft of the thesis is due to the committee members at least two weeks prior to the scheduled defense.

ix) **Meet with the Graduate Coordinator to sign the Degree Certification form.** Before you can schedule your final M.S. thesis defense, you must make sure you have met all of your degree requirements. In order to do this, you must meet with the Graduate Coordinator to review your academic record. Once it is determined that you have met all the degree requirements, the Graduate Coordinator will sign the Degree Certification form. **You will show this signed form to the Departmental Administrator and then you will be able to schedule a date and time to defend. Keep careful track of your signed Degree Certification Form, as it needs to be signed by the Department Chair and submitted to the Guarini School after you defend (see section xi below).**

x) **Pass a final oral defense of the thesis before the Thesis Committee.** All other members of the faculty are encouraged to attend this defense. The thesis defense will be preceded by a public oral presentation of the candidate’s research, giving all faculty and students a chance to ask questions or offer comments. No defense may be scheduled until: a) the thesis examining committee is approved by the Guarini School (see section vii above); b) a Degree Certification form is approved by the Department Graduate Coordinator (see section ix above). See **section 5d** for more information about the defense.

xi) **Have the Department Chair sign the Degree Certification form and submit the signed form to the Graduate Coordinator.** Once you successfully defend your thesis, you must have the Department Chair sign your Degree Certification Form and then submit the signed form to the Graduate Coordinator. The Graduate Coordinator will then submit the form to the Guarini School.

i) **Specific requirements- Ph.D.**

i) **Satisfactorily complete the following required courses or their equivalents,** if not already having done so prior to entering the Ph.D. Program.

(1) **EARS 107**—Mathematical Modeling in the Earth Sciences.

(2) **EARS 118**—Advanced Methods for Environmental Data Analysis.

- (3) **MATH 23**—Differential equations. It is strongly suggested that Math 23 be completed in the first two years of one's Dartmouth coursework if not already completed by the start of the graduate program. It is the responsibility of the student and their research committee to complete this requirement in a timely way, as well as to use the opportunities it affords to pursue further advanced quantitative coursework as appropriate.
- (4) One upper-level Science or Engineering course outside the Department eligible for graduate credit and **approved by the Graduate Coordinator**.
- ii) **Satisfactorily complete a minimum of three additional courses carrying graduate credit beyond the above required courses, for a total of nine graduate credits.** Of these three, a maximum of two courses from the EARS 270-279 series (topical literature) courses may be counted, including the same course twice. Courses not eligible for course credit towards a graduate degree include special project research (EARS 131), thesis research (EARS 141-143), supervised field instruction (EARS 145), and supervised undergraduate teaching (EARS 149). At the discretion of the thesis committee, some courses below the 100 level from outside the department (particularly ENGS) may be counted towards this requirement in addition to the single course required by **section 3hi4**.
- iii) **Submit names of the thesis committee.** Additional information on committee membership is given in **section 4**. This should be completed by April 1st of a student's first year.
- iv) **Submit a summer research project proposal.** The submitted project proposal must be signed by all members of one's committee, signifying their approval. This document should be prepared in close collaboration with one's research advisor. This should be completed by June 15th of a student's first year.
- v) **Successfully pass a qualifying exam set by the EARS faculty.** See **section 5b** for details on the qualifying exam. This should be completed by February 1st of a student's second year.
- vi) **Successfully present and defend the results from one's summer research project.** All members of one's summer research committee must be present at this exam. Additional information about scheduling and the nature of this defense is given in **section 5b**. This should be completed by February 1st of a student's second year.
- vii) **Present and defend a thesis proposal before one's thesis proposal committee. A draft of the thesis proposal is due to committee members at least two weeks prior to the scheduled defense.** While it is strongly recommended that the outside committee member be present

at one's proposal defense, it is not required. Additional information about scheduling and the nature of this defense is in **section 5c**. This should be completed before the end of the 11th term of a student's enrollment in the Ph.D. program (i.e., before the end of one's third year).

- viii) **Submit a copy of the thesis proposal**, signed by the committee, to the Graduate Coordinator. This should be completed by March 1st of a student's third year.
- ix) After the third year of one's Ph.D. research, it is expected that, at a minimum, a student will **meet with the Dartmouth members of their committee** once during the winter term each year to give a 20-minute presentation on the progress of their research. After this presentation, the committee will discuss the student's progress and determine what is required to ensure that they maintain satisfactory progress. **It is the graduate student's responsibility to prepare a short summary of this meeting and to provide a copy of this summary, signed by the graduate student and the advisor, to the Graduate Coordinator.**
- x) **Obtain thesis examining committee approval by the Guarini School.** Submit to the Guarini school a completed "PhD Examination Committee Approval Request" form, available on the Guarini School "Thesis and Dissertation Forms" webpage. This must be completed well before scheduling your thesis defense, and requires signatures from your advisor, the EARS Graduate Coordinator, and the Guarini School.
- xi) **Complete a thesis meeting the highest standards of professional scholarship.** The thesis may be a series of published (or at least publishable) papers linked by appropriate text. A near-final **draft of the thesis is due to the committee members at least two weeks prior to the scheduled defense.**
- xii) **Meet with the Graduate Coordinator to sign the Degree Certification form.** Before you can schedule your final Ph.D. thesis defense, you must make sure you have met all of your degree requirements. In order to do this, you must meet with the Graduate Coordinator to review your academic record. Once it is determined that you have met all the degree requirements, the Graduate Coordinator will sign the Degree Certification form. **You will show this signed form to the Departmental Administrator and then you will be able to schedule a date and time to defend. Keep careful track of your signed Degree Certification Form, as it needs to be signed by the Department Chair and submitted to the Guarini School after you defend (see section xiv below).**

xiii) Pass a final oral defense of the thesis before the Thesis Committee.

All other members of the faculty are encouraged to attend this defense. The thesis defense will be preceded by a public oral presentation of the candidate's research, giving all faculty and students a chance to ask questions or offer comments. No defense may be scheduled until: i) membership of the thesis committee is approved by the Guarini School (see section x above); ii) a degree completion form is approved by the Graduate Coordinator (see section xii above). See **section 5d** for more information about the defense.

xiv) Have the Department Chair sign the Degree Certification form and submit the signed form to the Graduate Coordinator.

Once you successfully defend your thesis, you must have the Department Chair sign your Degree Certification Form, and then submit the signed form to the Graduate Coordinator. The Graduate Coordinator will then submit the form to the Guarini School.

j) Thesis Submission - all degrees

i) Submit one signed copy of the thesis to the Guarini School for editorial review.

Details on the required formatting of theses are available online. Pending editorial approval of one's thesis by the Guarini School, the candidate will **upload the final version of their thesis to ProQuest** by following the "Submitting an electronic Thesis" link through the Guarini School website.

ii) Optional bound copies— Directions for obtaining personal bound copies of the thesis are given when the thesis is uploaded. A credit card must be used. Any remaining student research funds can be used for extra copies.

4) Thesis and exam committee membership

a) General guidelines for the composition of one's thesis committee are given in the Guarini School Academic Policies. The student and primary research advisor will choose the other members of this committee during their first year no later than the April 1st deadline and submit these names to the Graduate Coordinator. If the student's primary advisor is a senior faculty member, then there must be at least one other senior faculty member on the committee. The composition of this committee may change as a student's academic interests evolve.

Final approval of any thesis defense committee rests with the Dean of the Guarini School. To this end, prior to scheduling the defense of one's thesis for either M.S. or Ph.D. degrees, the degree candidate must submit the names of

the members of the thesis defense committee for approval by the Guarini Dean. The necessary form for this submission is available from the Guarini School website and the Graduate Coordinator.

- b) **M.S. Committees** generally consist of three faculty members from the EARS Department (including the advisor). One of the three may be, but is not required to be, from outside the Department. With approval from the Guarini Dean, the third member of the thesis committee may be an emeritus faculty member, research faculty member, or other similar Ph.D.-level expert with a demonstrated record of active and on-going peer-reviewed research and who is qualified to critique the student's work.
- c) **Ph.D. Committees** consist of a total of at least four members: A minimum of three full-time Dartmouth faculty members, at least two of which must be from the EARS Department (including the advisor), plus an external member with a faculty-equivalent appointment outside of Dartmouth. With approval from the Guarini Dean, the third Dartmouth member of the thesis committee may be an emeritus faculty member, research faculty member, or other similar Ph.D.-level expert with a demonstrated record of active and on-going peer-reviewed research and who is qualified to critique the student's work. Also, with approval from the Guarini Dean, the external committee member may be a staff scientist at a research facility (e.g., USGS, CRREL, NASA). In these cases, the external committee member should have a demonstrated record of active and on-going peer-reviewed research and should be uniquely qualified to critique the student's work. The external member may participate in meetings and defenses in person or via videoconference.

5) Oral exams and dissertation defenses in the M.S. and Ph.D. programs

- a) **Scheduling and procedures:** The summer research defense (Ph.D.), the dissertation proposal defense (Ph.D.), and final dissertation (Ph.D.) and thesis (M.S.) defenses should be scheduled at times when a maximum of members of the Department can attend. Students and advisors should work together to coordinate all examinations and defenses during a term to assure best-possible attendance and departmental faculty participation.

To ensure a fair and appropriate process, an EARS department faculty member not on the committee will attend all defenses and remain through the closed session as well as the committee discussions. This faculty member is typically the Graduate Coordinator but can also be the Chair, Graduate Liaison, or other faculty member if the Graduate Coordinator is a committee member or unavailable. This faculty member may ask questions during the defense but

will not vote on the outcome of the defense. In addition, any member of the EARS faculty may attend and ask questions at the closed session of a defense.

Before you can schedule your final Ph.D. dissertation or M.S. thesis defense, you must make sure you have met all of your degree requirements. In order to do this, you should meet with the Graduate Coordinator to review your academic record.

Once it is determined that you have met all the degree requirements, the Graduate Coordinator will sign the Degree Certification form. You will show this signed form to the Departmental Administrator and then you will be able to schedule a date and time to defend.

After you defend and are ready to turn in your thesis, you must have the Degree Certification form signed by the Department Chair and give a signed copy to the Departmental Administrator for your file. The original version of this form is to be submitted to the Guarini School office along with the number of required copies of your thesis.

Please note: Once the Graduate Coordinator signs the Degree Certification form and you show it to Departmental Administrator to schedule your defense, you must hold onto this form until after your defense for chair signature. You may ask the Dept. Administrator to place this signed form in your department file for safekeeping.

b) Summer research defense and oral qualifying exam for Ph.D. Candidates:

The candidate will arrange to present and defend their summer research results before the summer research committee. At the same time, the candidate must pass an oral qualifying exam based on an understanding of the literature related to the candidate's subdiscipline.

Any candidate who does not successfully pass the summer-research defense by March 31st of their second year, unless there are extenuating circumstances, will be dismissed from the Ph.D. program, and admitted to the M.S. program.

The summer research defense will be preceded by a public oral presentation of *the background, aims, methods, results, and conclusions* from the candidate's summer research. After the presentation, all faculty and students will be given a chance to ask questions or offer comments. At the conclusion of the open session, the candidate and committee will enter a closed session. During the defense, the candidate's approach to research will be scrutinized for its significance, timeliness, logical coherence, and optimization of research approaches. Please note that the purpose of this exercise is for the Ph.D. candidate to successfully demonstrate to the faculty that they can propose, design, execute and report on a 'stand-alone' research project.

In addition to the closed oral defense of the summer research project (approximately 1 hour), time in the closed session will be given to a more general qualifying exam (up to 2 additional hours for a total ~3 hour closed defense). At the time of approval of the summer research proposal, the candidate will be given two papers, potentially unrelated to the specifics of the project, by each summer research committee member (with a maximum of 6 papers for students with committees larger than 3). These papers could be anything from recent papers in the field to more classic papers selected by the committee member. The qualifying portion of the exam will be devoted to discussion of these papers – the expectation is that the candidate will read them in detail, discuss them with committee members prior to the defense, and read very broadly around those topics to be able to answer detailed questions related to the contribution.

At the conclusion of the summer-research defense, the summer research committee will evaluate the student's performance and preparation to pursue Ph.D. degree in the following terms:

- i) Unconditionally invite the candidate to write and defend a Ph.D. thesis proposal;
- ii) Conditionally invite the candidate to write and defend a Ph.D. thesis proposal after completion of remedial action(s);
- iii) Invite the candidate to re-defend their research and/or take the oral exam at a later date; this option will only be made available during the first defense;
- iv) Accept the student into the M.S. program.

In the case of a conditional pass (option **5bii**, above), which is assigned if, in the committee's view, the candidate fails to adequately defend the results from their summer research or lacks preparation in certain areas of their Earth science background, the committee will advise remedial action. Such action may include the candidate's completion of additional courses, directed reading with a faculty member, assigned teaching assistantships, or additional research. It is the candidate's responsibility to assure that any deficiencies are made up expeditiously. **The candidate may not defend a thesis proposal until all recommended remedial actions are complete.**

In the event of option **5biv**, above, or in the event that a Ph.D. candidate fails to schedule and satisfactorily pass their summer-research defense by the appointed deadline, the candidate will be admitted into the M.S. program. In this event, and given successful completion of one's M.S., the student must re-apply to the Ph.D. program if they wish to continue to pursue a Ph.D. degree.

- c) **Dissertation proposal defense:** A draft of one's proposal for Ph.D. research must be submitted to the members of one's Thesis Committee at least two

weeks prior to the proposal defense. An accompanying presentation is required in front of one's thesis committee, but any student may also choose to present to the entire department. The committee-only presentation is open to any interested faculty member, and it is strongly recommended that the external committee member be encouraged to attend. The purpose of this defense is to further evaluate and refine the dissertation proposal, to make the proposal and subsequent dissertation the strongest possible document.

If the committee finds that the candidate lacks preparation in certain areas of their Earth science background, the committee will advise remedial action. Such action may include taking of additional courses, directed reading with a faculty member, assigned teaching assistantships, or additional research. It is the candidate's responsibility to assure that any deficiencies are made up expeditiously.

If the committee finds the dissertation proposal and defense unacceptable, the candidate may be given an opportunity to revise the proposal and defend it again during the next academic term. Two successive failures will automatically result in dismissal of the candidate from the Ph.D. program. At the discretion of the thesis committee, the student may be admitted into the M.S. program.

If a Ph.D. candidate has not defended their thesis proposal by the end of their 11th term (i.e., the end of one's third year), pending any extenuating circumstances, progress in the program will be considered unsatisfactory and the candidate's funding may be revoked, and/or they may be dismissed from the Ph.D. program. At the discretion of the thesis committee, the student may be admitted into the M.S. program.

- d) Final M.S. or Ph.D. dissertation defense:** Candidates for M.S. and Ph.D. degrees must present a public presentation of their thesis research, followed by a private meeting with the thesis committee. **A near-final draft of the thesis or dissertation must be submitted to committee members a minimum of two weeks prior to the defense.** Students must arrange scheduling of the defense with the committee prior to making any final arrangements with outside examiners. At the end of the closed session, the thesis committee will indicate one of the following:
- i) Approved**
 - ii) Approved with minor revision**
 - iii) Requiring major revisions**
 - iv) Fail**

If major revisions are required, the committee will provide a summary of the main comments and requirements, and a schedule for revisions and completion of the degree. If the candidate fails the final defense, they may be given an opportunity to revise the thesis and defend it again during the next

academic term. Two successive failures will automatically result in dismissal of the candidate from the program.

6) Students holding previous graduate credits and degrees

- a) **Students with graduate credits from elsewhere:** A student entering the Dartmouth EARS graduate program with graduate credits from another institution may, at the discretion of the Graduate Coordinator, transfer up to 6 course credits towards the Ph.D. If any of these courses are identical in content to the EARS requirements, they may be counted as such, exclusive of the EARS 201-203 and EARS 270-279 series. Irrespective of the number of credits transferred in this way, at least one course numbered 100-199 taken at Dartmouth is required.
- b) **Students in the Earth Sciences M.S. program at Dartmouth wanting to continue toward a Ph.D. in Earth Sciences at Dartmouth:** A student currently enrolled in the Earth Sciences M.S. program who wants to continue toward the Ph.D. degree should proceed as follows:
 - i) Notify their advisory committee and the Graduate Coordinator of their plan promptly and in writing, outlining research interests. Early notification will facilitate the development of a coherent M.S. to Ph.D. program transition.
 - ii) The decision to transition from an M.S. to a Ph.D. must be approved by the advisory committee and the Graduate Coordinator.
 - iii) If it is decided to make the transition prior to earning an M.S. degree, the student must complete all the regular Ph.D. degree requirements within the regular timeframe that begins upon matriculation to the Ph.D. program. However, students may opt to complete some of the degree requirements at an earlier date. Also, with the approval of their Ph.D. committee, a student continuing to a Ph.D. degree may use EARS 141-143 to count toward the nine graduate credits required of the Ph.D. degree.
 - iv) If it is decided to complete an M.S. degree prior to starting the Ph.D., in parallel with the policy pertaining to students entering with a M.S. from elsewhere, the student can count up to 6 courses taken for the M.S. towards the Ph.D. requirements.

TWO-YEAR COURSE PLAN WORKSHEET

Pre-requisites completed (list the courses taken that fulfill the prerequisites, see section 3a for more information):

Math (equivalent of MATH 3 and 8): _____

Chemistry (equivalent of CHEM 5 and 6): _____

Physics (equivalent of PHYS 13 and 14, or 3 and 4): _____

Biology (equivalent of BIOL 11 and 16) _____

Academic year _____

Summer	Fall	Winter	Spring

Academic year _____

Summer	Fall	Winter	Spring

Date prepared: _____