

# **Geology & Earth Science Graduate Program**

**Graduate Student  
Handbook**  
(May 2023)

**Iowa State University**  
College of Liberal Arts & Sciences  
Department of Geological & Atmospheric Sciences

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# *Program Overview*

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This handbook is intended to help guide you through the Geology and Earth Science Graduate Program within the Department of Geological and Atmospheric Sciences (GEAT), including requirements related to M.S. and Ph.D. degrees, departmental procedures, and deadlines.

The document is subject to all policies as stated in the Graduate College Handbook and other University and College documents. Should conflict arise, University and College policies take precedence over those in this document.

## **Learning Goals for Graduate Students in Geology and Earth Science**

GEAT seeks to establish outstanding research and innovative teaching programs that apply fundamental principles of physics, chemistry, biology, and mathematics to interdisciplinary problems related to the Earth sciences. Motivated and talented graduate students are fundamental to the success of both the research and teaching missions of GEAT. Graduates of the Geology and Earth Sciences Graduate Program should achieve the following learning goals:

1. Demonstrate comprehensive understanding of scholarly literature in the area of study.
2. Form testable hypotheses and articulate research objectives that, when met, will lead to significant contributions to the field of study.
3. Conduct qualitative and/or quantitative research via appropriate acquisition, analysis, and reporting of data.
4. Interpret research results appropriately, integrating them into the existing knowledge in the discipline.
5. Clearly and accurately communicate research findings orally and in writing, and often through the use images (tables, figures, and other forms of imagery) and electronic or other forms of media.
6. Articulate how the Program, including coursework and creative scholarship, fits into life and career goals.
7. Conduct scholarship, in teams or with independence, in ways that consistently demonstrate ethical practice and professionalism.

## **Program Structure and Administration**

The Geology and Earth Science Graduate Program (hereafter the Program) is administered by the Chair of the Department of Geological and Atmospheric Sciences (hereafter the Department).

The Curriculum Committee oversees the curriculum for all academic programs within the Department and works under educational philosophies established in the Department's Mission Statement. This committee consists of faculty that represent all the Department's academic programs. Committee members are selected by the Chair and confirmed by the Faculty.

The members of the Program's Graduate Admissions Committee are appointed by the Chair. The Committee sets procedure for review of graduate applications.

The Director of Graduate Education (DOGE) serves as a liaison between the Program and the Graduate College. The DOGE is responsible for management of the Program, works with standing GEAT committees to establish policies, participates in graduate admissions, and reviews the Programs of Study (POS) forms of all graduate students.

The Graduate Support Specialist (GSS) is typically the Department's administrative assistant. This person is responsible for generating letters of intent (LOI) regarding each graduate student's

assistantship. The GSS has reference numbers for course registration. The GSS office is also the Department office, 253 Science Hall.

Each graduate student has a Major Professor who chairs their Program of Study Committee (POSC).

The Geology Graduate Student Organization (GGSO) advisor meets regularly with the GGSO advise on the expectations and events to be organized by the GGSO.

## **Faculty and Their Research**

Faculty in the Program are members of or are formally affiliated with the Department and have been appointed as graduate faculty of the university by the Graduate College. A [list of current faculty](#) can be found on the Department webpage.

Additional information about graduate faculty membership and associate membership can be found in [Appendix G of the Graduate Handbook](#).

# *Requirements and Expectations*

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## **English Language Requirements**

Use of the English language is expected to improve for all students as they progress toward their degrees. Students are expected to seek out opportunities for oral and written presentations and, if needed, to take formal coursework in these areas.

Graduate students whose native language is not English and who do not have a bachelor's or advanced degree from ISU or a U.S. institution, or do not meet the TOEFL or IELTS exemption score range, must take the English Placement Test at the beginning of their first semester of enrollment. This test is administered by the Department of English. It must be taken in addition to TOEFL, which is taken as part of the admissions process. A student who does not pass this examination is assigned to one or more courses in the English 99 and 101 series. This coursework must be completed during the first year of study. Registration holds are placed on the student's account if the student does not register for these classes during the first year of study. (There is a developmental course fee for the English 99 course.)

All international students who are nonnative English speakers and have teaching responsibilities are required to take the Oral English Certification Test (OECT) before they may be assigned duties. Students not reaching Level-1 (full certification) are required to take English 180, Communication Skills for International Teaching Assistants.

## **Expectations for Dissertations, Theses, and Creative Components**

A dissertation, thesis, or a creative component submitted as partial requirement for the M.S. and Ph.D. degrees is expected to be written in a professional manner and should meet a standard equal to that of a leading scientific journal. Students, rather than faculty advisors, are ultimately responsible for ensuring that drafts of the dissertation, thesis, or creative component meet a high standard. Additionally, M.S. and Ph.D. students must have a public oral presentation of their thesis as part of their defense.

Students should consult the [Theses & Dissertations](#) information on the graduate college website for up-to-date templates and writing resources. The [Center for Communication Excellence](#) (CCE) in the Graduate College offers speaking and writing courses, which students are encouraged to include

in their POS. The CCE offers speaking and writing consultations, peer review groups, and numerous workshops. The CED also offers [Academic Communication Practices](#) (AcComP) certificate specifically designed for students for whom English is not the first language.

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## Academic Standards

If a graduate student, M.S. or Ph.D. candidate, does not maintain a cumulative 3.0 grade point average on all course work taken, exclusive of research credits, they are placed on academic probation by the Dean of the Graduate College. Grades earned by graduate students in undergraduate courses at ISU are included in the calculation of the grade point average.

While on academic probation, a student cannot be admitted to candidacy for a degree and if appointed to a graduate assistantship, the student may be denied a tuition scholarship by their academic college. The Graduate College places a hold on future registration to ensure that registration does not take place without a review by the Department. Before the student registers for the next term, it is necessary for the Department to review a student's record and recommend whether the Graduate College should continue to permit registration. Probationary status for more than two years is grounds for dismissal for failure to maintain academic standing.

Before graduation is approved, the student must complete all courses listed on the POS with a "C" (2.0) or above and have an overall 3.0 average, unless an exception is recommended by the student's committee and approved by the Graduate College.

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## *Financial Support*

### Graduate Assistantships (GA)

Teaching assistantships (TA) are available for classes offered within the Department on a competitive basis for students admitted on a full-time basis. Research Assistantships (RA) are generally provided from the research grant of an individual faculty member. Stipends are typically for a 1/2-time (up to 20 hours per week) during the academic year (i.e., a 9-month appointment). Current stipend rates are published on the Department [website](#). Additional assistantships may be available during the summer semester. At the beginning of a semester, students supported by assistantships are expected to report to their Major Professor or to the instructor of record they will be assisting as early as possible in the week prior to when classes begin. TAs should contact the instructor of record they will be assisting as early as possible in the week prior to when classes begin. If a TA assignment does not provide 20 hours per week, students may be assigned additional duties as a Department Assistantship (DA).

Teaching assistantships play a crucial role in the teaching mission of the department and generally involve 20 hours per week in the form of preparation, teaching, and grading for laboratories and courses. To be eligible for a TA, a student must have very good teaching and adequate English-speaking skills, and a background in Geology or Earth Sciences. Teaching duties are usually assigned by an appointed faculty member based upon class schedules, previous experience. If you have been given a TA, provide your class schedule to the faculty member in charge of TA assignments as soon as it becomes available prior to the appropriate semester. Before a student can be considered for a TA for geology courses, they must have taken physical and historical geology courses (with labs) previously or while enrolled as a graduate student in the Department.

**Teaching assistantships that involve the use of samples (e.g., minerals, rocks, fossils) and/or equipment for teaching include the responsibility of returning those samples and equipment to where they are stored and in the state they were found. Leaving samples/equipment in disarray at the end of the semester can ultimately result in loss of TA support in future semesters.**

Additional TA positions are also periodically available to students in the Program through the Department of Chemistry. To be considered for a Chemistry TA, a student must have completed two semesters of university level chemistry with a grade of B+ or better for each course. The following rules also apply:

1. TAs who do not attend the first organizational meeting of the semester will not be paid from the beginning of the TA appointment until the first day that they return to work. In fall, the start date is August 16th; in spring, it is January 1st. TAs are to be back and ready to work on Wednesday morning the week prior to the start of classes. TAs are not be paid for days when teaching responsibilities are missed due to personal travel.
2. TAs who miss teaching responsibilities prior to the end of final's week will not be paid for any days following the missed work through the end of the appointment. In the fall and spring semesters, this means no pay from the date that they leave through December 31st and May 15th, respectively.
3. TAs who miss teaching responsibilities either the week prior to or following Thanksgiving or spring break will not be paid starting from the date of the first missed work assignment and until they return to ISU including the five days of recess or break.
4. When a TA accepts a position, they have a professional obligation to teach for the complete academic semester, including attending the organizational meeting(s) held the week prior to the start of a semester and through the end of final exam week. Teaching assistants do not have paid vacation days. There are circumstances when an individual may not be able to fulfill her or his teaching obligations (illness, funeral, family emergency, etc.); under these circumstances, the TA must work with the course instructor and support staff (laboratory personnel and/or the undergraduate chemistry office) to assure that his/her classes are covered.
5. In cases of illness, a funeral, a family emergency, or other extraordinary circumstances that prevent a TA from fulfilling their teaching responsibilities, he/she shall follow specific course policies for notifying the teaching supervisor and finding a replacement. Teaching assistants in general chemistry must contact personnel in the undergraduate chemistry office (1608 Gilman Hall). It is critical that TAs keep Renee Harris and Lynette Edsall fully apprised of their situation. If the absence is because the TA will attend a professional meeting, he/she must find a replacement that is acceptable to their teaching supervisor at least two weeks prior to the meeting. The TA must cover all teaching obligations.

Research assistantships are assigned to allow a student to aid a faculty member in their research. The interests of the student are matched with those of a faculty member, and the work generally leads to thesis or dissertation research.

Summer assistantships may be available for one or more summer months. The Department provides one month of 1/2-time support every summer during their degree, up to two years for an M.S. and four years for a Ph.D. Additional RA support may be provided by the Major Professor for up to two months. Note that if you receive a summer assistantship you must register for at least one credit.

Additional support is normally provided for graduate students holding an assistantship. An M.S. student on full admission with a 1/2-time assistantship receives a Graduate Tuition Scholarship for 50% of resident tuition, with the remainder being covered by the Department via a Morehouse Fellowship. Ph.D. students on assistantships receive a scholarship award that pays 100% of the in-state tuition costs.

### **Assistantship Time Limit**

Teaching assistantships are given on a year-by-year basis at the discretion of the Chair in consultation with the Program faculty. Assistantship support will be continued depending on satisfactory evaluations from previous teaching assignments, adequate progress in thesis-related

research, and whether departmental deadlines (such as POS meeting or Ph.D. preliminary examinations) have been met.

Graduate assistantships (i.e., TA + RA + DA) will be for no more than 2.5 years for students seeking M.S., 4 years for a Ph.D. student already with an M.S., and 5 years for a Ph.D. student with no M.S., commencing from the first semester of enrollment. No more than 2.5, 4, or 5 years of support, respectively, can be in the form of a TA regardless of which department is providing the TA. Up to two additional semesters of assistance may be provided to Ph.D. students with support coming in the form of a RA from their Major Professor.

## **Benefits**

Insurance: GAs with an appointment of one quarter time or more for at least 3 months of the fall or spring terms receive self only health insurance coverage as a benefit for the term at no cost. You may purchase a Group Health Insurance plan, which covers hospitalization, accident expenses, surgery and maternity benefits for yourself, your lawful spouse or domestic partner, and your eligible children. Dental insurance for graduate students, and their lawful spouse or domestic partner and families is available and may be purchased for an additional premium. More information can be found at the Graduate College [website](#).

Graduate assistants will also be eligible for up to twelve weeks of [paid parental leave](#), provided by the Graduate College and the College of Liberal Arts and Sciences. Maternity or paternity leave requires that the remainder of the semester is covered by either teaching or research assistantship to qualify for the paid benefit.

Holidays: Graduate assistants are not required to be at the university during official holidays, which include New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and the Friday after Thanksgiving, Christmas, and two additional days each year determined by the President and ISU Administration.

# *Guidance for New Students*

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## **Computers**

All Iowa State students are [required](#) to have a laptop computer. Information related to software and file storage can be found on the Information Technology [Service Portal](#). Software is available for University-owned computers.

The computer lab in room 255 is primarily intended for class-related work but is open for research-related work when not in use by a course. Anyone using a computer for personal purposes (e. g., E-mail, web surfing, etc.) should surrender the computer upon the request of anyone wishing to do coursework or research.

## **Credit Limits and Requirements**

The Graduate College Handbook [Chapter 2](#) covers enrollment, registration, and tuition and fees. Registration in credit courses is limited to a maximum of 15 credits per semester (10 credits for summer session) for graduate students, per Board of Regents. For a student on a 1/2-time assistantship, the credit limit is 12 during the semester and one during the summer. Graduate assistants must register for a minimum of one credit each term that they hold an appointment. Graduate students must register for a minimum of one credit during the semester in which the final oral examination is taken. Commonly, a single credit needed during a summer or the final semester is attained by registering for a research credit.

## **Graduate-Level Geology Courses**



Descriptions of courses taught in Geology can be found in the [Course Catalog](#). To see which classes are being offered in upcoming semesters, consult the [Schedule of Classes](#).

## **Keys and Key Card Access**

Science Hall is open M-F and locked on weekends and university holidays. Graduate students can request key card access on their ISUCard from the GSS. Access is usually given as 24/8 (24 hours; 7 days a week; plus university holidays). In case of a lock out, contact Facilities Planning and Management (FP&M): 515-294-5100, Building Security Services: 515-294-4211, or the ISU card office: 515-294-2727.

Keys will be issued upon request of the Major Professor. The application for building, room, and laboratory keys is completed in 253 Science Hall. Processing of key applications may take up to two days. Keys must be returned to the Key Issue Desk, Facilities, Planning and Management Building, prior to graduation. There is a \$30 fine per lost key, which will be applied to the student's UBill.

## **Mailboxes**

Graduate students have assigned mailboxes in the departmental copy room (room 252 Science Hall). Program faculty have mailboxes in the Department Office (room 253 Science Hall).

## **Office Space**

New students are generally assigned a desk in one of many office spaces in Science or Agronomy Hall and should expect to share space with one or more students.

## **Orientation**

Each fall, a new student orientation for students in Geology, Earth Science, and Meteorology graduate programs. The orientation is required for incoming students, and continuing students are encouraged to attend. Topics may include: introduction to the Department, graduate college, and university resources; lab & safety orientation and trainings, POS for graduate degrees; and resources for life in Ames.

## **Photocopying and Printing**

Students may be given a code by their advisor for research, teaching, or university-related business copying and printing. The photocopier has scanning capability.

Students should use their personal print credits on university-owned printers in classrooms and computer labs. Information on print credits can be found on the Information Technology [website](#).

## **Registration & Schedule Changes**

Graduate students should register following instructions on [Registration webpage](#) as soon as the time period opens for them. This will ensure that courses are not cancelled due to low enrollment. A reference number is required for all courses. General course numbers are listed on the Registrar's website. The GSS or your Major Professor can give you the reference numbers for research and special topics. These reference numbers stay the same for semester to semester.

Forms and information for schedule or program changes can be found on the registrar's webpage for [students](#). Adding or dropping classes may cause your status to change from part-time, half-time or full-time and may affect your academic or financial aid status. Please speak with your Major Professor if you have concerns.

## **Start Dates**

Students on assistantships Need to be on-campus from August 16 for Fall semester and from January 1 for Spring Semester. Nine-month appointments end May 16. Any absences should be arranged with your Major Professor or assistantship supervisor.

## **Student Rights and Responsibilities**

Graduate students are expected to demonstrate a commitment to their academic endeavors, to make steady progress toward academic milestones and goals, and to demonstrate ethical practices at all times. All graduate students are governed and protected by:

- the Board of Regents' Uniform Rules of Personal Conduct,
- the [Student Code of Conduct](#) that contain the Student Conduct Code and student judicial process,
- University regulations in the “[Student Life](#)” section of the Policy Library,
- for students on appointment, the “[Personnel, Conduct & Human Relations](#)” section of the Policy Library, Department procedures, and the terms of sponsored research agreements that fund their assistantships or other employment,
- academic policies in the University Catalog,
- Department or Program rules and policies,
- grievance procedures described in this chapter,
- the University’s [Sexual Misconduct, Sexual Assault, Sexual Harassment, Stalking, and Intimate Partner Violence Involving Students Policy](#), and
- the University’s [Discrimination and Harassment Policy](#).

Graduate students on assistantship appointment also are governed by the policies applicable to instruction, research, and the conduct of University business as found in the [Policy Library](#). Everyone engaged in graduate education to adhere to the University’s [Principles of Community](#).

Grievance procedures are outlined in the Graduate College Handbook [section 9.5](#).

## **Travel Authorization**

Students on assistantships must fill out a Travel Authorization Form if leaving the state of Iowa during the semester. The form is available on the [Department web page](#) under Resources→Departmental Forms.

All graduate and professional students traveling internationally and using funds administered by Iowa State University to pay for any portion of the trip are required to register their travel through the [Office of Risk Management](#). Registered travelers are provided with insurance through this process.

Students needing a travel reimbursement should initiate the process with an email to [finance\\_delivery@iastate.edu](mailto:finance_delivery@iastate.edu).

## **Training**

If you will be working in one of the Department’s laboratories, it will be necessary for you to undergo training through Environmental Health and Safety (EH&S) prior to beginning your work. Students should conduct a Training Needs Assessment in consultation with their Major Professor or supervisor through [EH&S/Learn@ISU](#) (will transition to Workday in 2023-2024) and complete required trainings before working in a lab.

Each departmental laboratory may have a slightly different set of safety rules, which is to be followed explicitly. No unauthorized experiments will be allowed in any Department lab, and proper protective equipment (safety glasses, lab coats, etc.) should always be worn. See the supervisor of the lab in which you wish to work for specific details.

Some laboratory operations may require that you use a respirator to ensure your safety. See your laboratory supervisor to be sure. Special training is required in this instance, as well (see EH&S). If you have any additional concerns about laboratory usage or safety, please contact Suzanne Ankerstjerne ([ankerssm@iastate.edu](mailto:ankerssm@iastate.edu)).

## Transportation Services

Graduate assistants who will reserve vehicles and drive for departmental teaching or research should begin by submitting a [Motor Vehicle Records Check](#). Note that approval is fast if your driver's license is for Iowa but could take months or weeks if out of state.

If you will need to drive a 15-passenger van and/or trailer you will need to complete additional [training](#).

## University Accounts

[Information](#) on setting up and accessing your online accounts and services can be found at the Information Technology [Service Portal](#).

## Visas

International students on visas (F-1 and J-1) are required to maintain a certain number of credits. International students, even those in their final term, must be registered full-time or previously approved by the International Students and Scholars Office (ISSO) to reduce their course load. Information can be found on the [ISSO website](#).

# Program of Study (POS)

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A POS Committee (POSC) guides and evaluates the student during their graduate study. Among the committee's duties are:

- reviewing periodically the progress of the student;
- advising a student during the development of the dissertation, the thesis, or the creative component;
- considering and approving the student's POS as well as changes in the POS;
- reading the dissertation, thesis, or creative component; and
- conducting the preliminary oral examination (for doctoral candidates) and the final oral examination (for master's and doctoral candidates).

Students are encouraged to establish a POSC as soon as the Major Professor is selected. The student forms a POS Committee and schedules a POS meeting by the end of the second semester of graduate study.

An [online POSC form](#) is approved by the student, committee members, and the DOGE of the major, minor or interdepartmental major/minor, if appropriate, before submitting it to the Graduate College. All changes to an approved POS must be done electronically and resubmitted to the Graduate College with the agreement of the student, Major Professor, and the DOGE. Major changes, such as course substitution, changing from thesis to non-thesis, or vice versa, and deletion or addition of a declared minor, require POS Committee concurrence and the signature of the DOGE on a resubmitted POS form before approval from the Graduate College is sought.

The POSC form must be approved by the Graduate College at least three calendar months before the preliminary oral examination for doctoral candidates; the three calendar-month timeframe for scheduling a preliminary oral examination begins the day that the Graduate College approves the POSC. For master's students, the POSC must be approved by the Graduate College by the last day of the semester prior to the term of the final oral examination.

Students are responsible for seeing that the requirements for a graduate degree are satisfied and that they have met the appropriate deadlines for filing forms with the Department or the Graduate College. Students should read the Graduate College [Handbook](#) and be aware of the Graduate College's [guidelines](#) for theses and dissertations.

The following requirements have been established by the Graduate College and the Program for the makeup of a POS Committee:

### **M.S.**

- a. The POS Committee has at least three members.
- b. Two members, including the Major Professor, must be from the Program. It is strongly encouraged that the committee include one member from outside the Department.
- c. All committee members must belong to the Graduate Faculty of the University.
- d. If a minor is being pursued by the student, a member of the advisory committee associated with the minor must also be on the POS Committee.

### **Ph.D.**

- a. The POS Committee has at least five members.
- b. All committee members must be members of the Graduate Faculty.
- c. At least three POS Committee members, including the Major Professor, must be from the Program. The committee must also include one or more members from outside the Department.
- d. If a minor is being pursued by the student, a member of the advisory committee associated with the minor (see ISU General Catalog) must also be on the POS Committee.

### **Annual Evaluation**

The Graduate College requires that all active Ph.D. students have an annual review of their progress. The Ph.D. student will meet annually with the POSC to review the following: 1. Milestones or accomplishments reached (this should include academic performance, research activities, publications, presentations, professional improvement activities, institutional or professional service, or other); 2. Challenges (this should include any obstacles that have presented or hindered your ability to achieve your goals for the year); and 3. Discussion of goals for the coming year. Unsatisfactory progress during the previous year may result in assistantship support not being given in the following year. The [form](#) to be filled out by the committee and signed by the student after the annual meeting can be found on the Graduate College (see Geology Program) and the Department webpage. Annual evaluations will be archived by the Chair and DOGE.

An annual evaluation is recommended for M.S. students.

## ***Graduate Degrees in Geology and Earth Science***

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### **M.S. Geology or Earth Science**

The Program offers M.S. degrees in Geology and in Earth Science. The Major Professor work with students enrolled the Program to assure that their POS will have appropriate breadth in Geology and Earth Science while permitting suitable specialization. Students in any of the M.S. degree programs are encouraged to take relevant course work outside of the Department and to take additional elective courses beyond the minimum specified in this document.

#### **Requirements for an M.S. in Geology or Earth Science**

The Program requires for the M.S. degree in Geology or Earth Science a minimum of thirty (30) credits of graduate-level courses distributed as follows:

- I. Fourteen (14) credits in GEOL courses numbered 500 or above.
- II. Ten (10) credits of elective courses in GEOL or in other disciplines relevant to the student's field of interest.
- III. 6 credits of research GEOL 699. A student may take more than 6 credits of research but may not apply more than 6 credits of research toward the 30-credit total required for graduation.

- IV. At least 22 credits must be earned at ISU.
- V. At least two semesters of GEOL 595A [*Graduate Seminar*], which includes participation in the Annual Geology Graduate Student Seminar Day. Two seminars must be given during the degree. Two credits earned in GEOL 595A count toward the fourteen credits in GEOL 500-level courses.
- VI. A written thesis in a format approved by the Graduate College.
- VII. A public oral presentation of the thesis followed by a final oral examination by the POSC.

Candidates for the M.S. degree in Geology or Earth Science complete a thesis based on the candidate's original research. A thesis may also include requirements established by the Graduate College, and must be written in a form that, with only minimal modification, can be submitted for publication in a scientific journal, book, field guide, or other appropriate portion of the professional literature. Notice of announcement of M.S. defenses will be circulated by the examinee to graduate students and faculty members in the Department at least two weeks prior to the defense. An electronic copy of the thesis should be made available to the Department one week prior to the defense.

### **M.S. in Geology or Earth Science (Non-Thesis Option)**

The objective of the non-thesis option is to provide non-traditional students with M.S. degree in Geology or Earth Science that requires coursework and a creative component.

Candidates for M.S. degrees with a non-thesis option must prepare a scholarly paper (a creative component) based on the candidate's interpretation of observations or ideas in the geologic literature.

The candidate must defend the product of the creative component before the POSC and are strongly encouraged to give the presentation publicly. A copy of the creative component must be given to committee members at least two weeks in advance, and the candidate distribute an electronic copy of the creative component to the Department at least one week before the defense.

#### **Requirements for M.S. in Geology or Earth Science (Non-Thesis Option)**

The Program requires for the M.S. degree in Geology or Earth Science (non-thesis option) a minimum of thirty (30) credits of graduate-level courses distributed as follows:

- I. at least 24 credits of GEOL and electives and 6 credits of Creative Component (GEOL 599). The POSC and the student's research will determine the coursework.
- II. At least two semesters of GEOL 595A [*Graduate Seminar*], which includes participation in the Annual Geology Graduate Student Seminar Day and the Spring Seminar series. Two seminars must be given during the degree.
- III. Candidates will produce a written creative component that represents substantial evidence of individual accomplishment in the form of a written report.
- IV. In the Final Oral Examination, the POSC determines whether a creative component is the candidate's individual accomplishment, is a worthy contribution to the field, and has been adequately defended. A creative component is acceptable if it meets those criteria.

#### **Additional Rules**

- 1. Students that apply for the non-thesis option in Geology or Earth Science will not be considered for a teaching assistantship. Individual advisors may provide funding for a research assistantship.
- 2. Students pursuing the thesis-based M.S. in Geology or Earth Science may switch to the M.S. (non-thesis option) during their stay at ISU; however, this will be allowed only under unusual circumstances. Students that are pursuing the M.S. (non-thesis option) may be admitted later to the thesis-based M.S. degree, provided that the student shows research promise and identifies a Major Professor. Granting of a teaching assistantship is dependent on the availability of departmental funding.

## **B.S./M.S. in Geology**

The Program requires for the M.S. degree in Geology or Earth Science (B.S./M.S. option) a minimum of thirty (30) credits of graduate-level courses distributed as follows:

- I. 6 credits of GEOL required (e.g., GEOL 579, 3 cr.) or electives at the 500 level that will count both for the BS and MS degrees.
- II. 6 research credits and 18 credits of 500-level GEOL electives in the 4th and 5th year.
- III. The research component can either be a thesis or a creative component.
- IV. At least two semesters of GEOL 595A [[Graduate Seminar](#)], which includes participation in the Annual Geology Graduate Student Seminar Day. Two seminars must be given during the degree.

## **Ph.D. in Geology or Earth Science**

### **Statement of Philosophy**

The Ph.D. degree emphasizes independent scholarly research; it prepares a graduate for leadership in the scientific community. A creative and productive scholar must have a good comprehension of basic principles, a capacity for critical and independent thought, and strong intellectual curiosity. In the evolution of a scholar, there is a transition from the stage where the primary concern is that of building a foundation to that in which the primary concern is extending knowledge through original research. The transition is a function of intellectual development and is different for each individual. The transition occurs when an individual has mastered sufficient knowledge to allow critical evaluation of material in the field of study. The extent to which an individual develops and exercises intellectual curiosity determines the ultimate success of that individual as a scholar.

The Ph.D. degree is intended to develop scholars. In the early stages of the Program, a firm comprehension of basic principles should be of primary concern. As graduate study progresses, the student should develop a disciplined, critical thinking and a strong intellectual curiosity. These skills should be honed during the latter stages of graduate study by the development of a dissertation that will be a significant contribution to the field chosen.

Students who are granted admission to the Ph.D. in the Program normally hold a M.S. degree. However, students without a M.S. degree but with particularly strong qualifications, as assessed by the Admissions Committee, can be admitted directly to the Ph.D. For a student without an M.S. degree, formal coursework equivalent to the requirement for a M.S. degree in the Department must be completed. Students who enroll as candidates for the M.S. degree can later continue, with no break in residence, for the Ph.D. In such a case, a student may petition the Department for waiver of the M.S. degree; such a petition may not be made until the student has successfully completed 12 credits of graduate level course work and can be no later than the end of the third semester of residence. The petition involves a statement (approximately 1 page in length) concerning the reasons why an M.S. degree should be waived and the nature of the proposed project. Waiver of the M.S. requires approval by the departmental faculty. For those students who enrolled originally as M.S. candidates, the preliminary examination will be taken by the end of the semester following approval of the Ph.D. POS form.

### **Requirements for Ph.D. in Geology or Earth Science**

A minimum of 72 graduate credits must be earned for a doctoral degree.

- I. At least 36 graduate credits, including all dissertation research, must be earned at ISU.
- II. A minimum of 18 credits of dissertation research must be applied to the 72 credits required.

- III. A minimum of 12 credits of course work is required for a Ph.D. student. This can include up to 6 credits of Graduate College courses (designated GR ST), as well as GEOL 590 and GEOL 595 courses.
- IV. Credits earned for the M.S. degree may be applied if approved by the POS Committee, with the restriction that no more than 36 credits, and no research credits, may be included in the Ph.D. POS.
- V. There is no specific university requirement regarding the number of credits to be taken inside or outside the major/program. For the specialization that is considered essential for an advanced degree, approximately two-thirds of the work should be devoted to the major field, but this is not necessarily restricted to one program.
- VI. Any transfer of graduate credits from another institution must be recommended in the POS the POSC, and graduate credit earned as a graduate student will be approved for transfer only if a B grade or better was earned.
- VII. Ph.D. students are required to register for GEOL 595A [[Graduate Seminar](#)], which includes participation in the Annual Geology Graduate Student Seminar Day, each time it is offered during the degree.
- VIII. A written thesis in a format approved by the Graduate College.
- IX. A public oral presentation of the thesis followed by an oral exam by the POSC.
- X. Ph.D. students must do at least one presentation at a scientific meeting.

### **Stages of the Ph.D.**

The Ph.D. has two stages: pre-candidacy and candidacy. The pre-candidacy stage consists largely of course work designed to broaden and strengthen the student's fundamental knowledge, particularly in areas related to the dissertation topic. The candidacy stage consists mainly of research for the dissertation.

At the conclusion of each stage of the Ph.D. there is a formal oral examination. The Preliminary Examination is taken at the end of the pre-candidacy stage with the goal of assessing the student's research potential and knowledge of related basic principles. The Final Examination is taken at the end of the candidacy stage and is concerned with the subject of the dissertation.

## **The Pre-Candidacy Stage**

### **Residence Requirements**

A student must be in continuous residence at the university during the pre-candidacy stage, except for interruptions such as the summer months or at other periods approved by the POS Committee. Part-time residence or transfer of credits from another university requires approval of the departmental Geology Graduate Admissions Committee.

### **Preliminary Examination**

The student takes the preliminary examination for admission into the candidacy stage by the end of the fourth semester of residence if admitted directly into the Ph.D. with a bachelor's degree, or by the end of the third semester of residence if admitted into the Ph.D. with a M.S degree. For those students who enrolled originally as M.S. candidates, the preliminary exam is taken by the end of the semester following admission into the Ph.D. and approval of the POS form. The preliminary examination cannot be taken during the same semester that the POS form (for the Ph.D.) is approved by the Graduate College.

Students are responsible for submitting the [Preliminary Oral Examination Request Forms](#) to the Graduate College in the timeline specified.

With advice of the POS Committee, the student selects a topic in which to prepare a research prospectus for the examination. The prospectus is a carefully prepared document not to exceed 30 (double spaced) typed pages, in which the problem and techniques to be used in solving the problem should be discussed in detail. The current status of the proposed field of investigation should be surveyed and important literature cited. The student should also discuss the relationship between the proposed research and broader aspects of earth sciences. The research prospectus should be in the general area of intended dissertation research. In addition, a realistic estimate of expenses necessary for completion of the proposed research should be included. The prospectus need not contain results of original research by the student but must be discussed if data have been collected. The examination committee shall consist of the members of the POS Committee. One copy of the prospectus must be given to each member of the examination committee **at least two weeks prior to the oral exam.**

### **Content and Form**

The preliminary examination is oral and is intended to evaluate the breadth and depth of knowledge in the field of study and to assess the student's potential to become a creative research scientist. The examination normally tests general knowledge as it pertains to the student's research prospectus, such as the principles and techniques on which the proposed research is based and on the relationships between the proposed research and other areas of study. Another goal is to evaluate, through questioning based on the prospectus, those attributes --originality, creativity, independent thought, awareness of significant problems in the field, --which are important to success in research. Questions concerning other areas of general interest shall also be asked.

### **Evaluation**

Two or more negative votes from the POS Committee constitute failure of the exam. Only one retake of the exam will be allowed; this retake must be done prior to the end of the following semester.

## **The Candidacy Stage**

### **Admission**

Passing of the Preliminary Examination, plus completion of the university requirements, constitutes admission to candidacy for the Ph.D. degree.

### **Dissertation**

A doctoral dissertation must be completed on a topic in the major field of study and written in a form that is suitable for publication. To be acceptable, it must constitute a significant contribution to knowledge within the field of study and be approved by the student's POSC. Final acceptance of the dissertation is dependent upon the donation and cataloging of dissertation specimens or their duplicates and good quality copies of maps, computer programs, etc. used in support of the research in the Department under the supervision of the major advisor. Copies of the completed dissertation must be in the hands of the POSC **two weeks prior to the date of the final oral examination.** An electronic copy of the dissertation needs to be provided to the Department. A printed copy of the dissertation should be provided for each of the committee members if so requested.

Students are responsible for submitting the [Graduation and Thesis/Dissertation Forms](#) to the Graduate College in the timeline specified.

### **Final Oral Examination**

A final oral examination will be taken after acceptance of the dissertation by the POS Committee and completion of all other work described for the degree including the presentation of dissertation related work at a regional, national, or international symposium. The final oral examination will be administered by the POS Committee with the Major Professor serving as chair. The examination is intended to be a defense of the dissertation. Notice of announcement of M.S. and Ph.D. defenses will be circulated by the examinee to graduate students and faculty



members in the Department at least two weeks prior to the defense. The final examination is open to all interested persons.

Students are responsible for submitting the [Final Oral Examination Request Forms](#) to the Graduate College in the timeline specified.

### **Revocation of Candidacy**

A candidate who has not completed a dissertation within four years after admission to candidacy must submit a written petition to the Chair for renewal of candidacy. The petition will be presented by the Chair to the full faculty for review. Otherwise, candidacy will be revoked, and the student must terminate work toward the Ph.D. If there is insufficient evidence of progress, the petition may be denied, and the student will be advised to discontinue work.

## *Seminar Requirements*

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### **Weekly Department Seminar**

All full-time students are required to enroll in GEOL 595 [*Graduate Seminar*], which has two parts: GEOL 595A, which must be taken every spring semester (1 Cr.) and GEOL 595B (R cr.), which must be taken every fall semester. A maximum of two credits from GEOL 595A can count toward a graduate students POS credit requirements. GEOL 595B during fall semester requires attending 80% of the weekly departmental seminar series to pass. GEOL 595A requires attending 80% of the weekly departmental seminars and presenting in the Geology Graduate Student Seminar. Seminar speakers in the departmental seminar series are lecturers invited from outside of the Department across the full spectrum of the geosciences. A lack of attendance to the weekly seminar will result in a failing grade for the semester.

### **Geology Graduate Student Seminar**

During the spring semester, prior to the spring break, a day is devoted to the presentation of conference-style talks by graduate students. The goals of this seminar day are twofold. Graduate students gain experience in public speaking in front of their peers and the entire faculty. This experience provides useful practice for the presentations that students give at scientific meetings. Also, these talks acquaint everyone in the Department with everyone else's research. All Program graduate faculty are expected provide written feedback to presenting students.

Each graduate student is expected to present a professional quality presentation, which is generally of 15 minutes length with 5 minutes for questions (20 minutes total) at each Geology Graduate Student Seminar while they are enrolled. Students are expected to give a presentation on the results of their current research project unless they are in the first year of enrollment in the Department. First-year M.S. students may give a presentation on any geological topic, whereas first-year Ph.D. students may give a presentation on a previous research project. Thesis and non-thesis M.S. students must present a minimum of two seminars during their degree.

The following exceptions to presenting a seminar may be made to students:

1. who have medical emergencies.
2. who have other legitimate emergencies (subject to approval from the Chair). Students should not request an exemption unless they have discussed the matter with their adviser and have their adviser's approval to petition the Chair.
3. who are admitted to the M.S. in a spring semester and applies only to that semester.

Any student who is granted an exception for reasons 1 or 2 above must give a seminar in the Department at the earliest possible time following the Geology Graduate Student Seminar or at the latest possible time prior to it.

A student who is granted an exception for reason 3 must participate in the Geology Graduate Student Seminar in their third semester (second Spring semester), give a seminar in the Department in their fourth semester, or present in the Seminar in their fifth semester (third Spring semester).

## *Geology Graduate Student Organization (GGSO)*

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The GGSO serves to foster academic and social cohesion among graduate students in the Program and the Department. Membership into the organization is extended to all fee-paying graduate students.

The GGSO is expected to:

1. Participate in the Program Orientation for new graduate students in the Fall.
2. Mentoring incoming graduate students in their first semester, which may include organizing social activities, such as a Fall Camping Trip.
3. Organizes the Annual Geology Graduate Student Seminar in the Spring.
4. Contribute a performance or activity at the Geology Banquet in the Spring.
5. Nominate one speaker per year for the Weekly Department Seminar.
6. Contribute to the Department's outreach activities.

The formal governance documents can be found on the student organization website:

<https://www.stuorg.iastate.edu/geograds/information>

## *Awards, Grants, Fellowships, & Internships*

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### **Awards**

#### **Geology and Earth Science Graduate Program Awards**

Several awards are given to graduate students in the Program at the Geology Banquet, which takes place each spring. The awards selected by a committee of faculty appointed by the Chair based on students who have been nominated by the faculty early in the Spring Semester.

- I. John Lemish Memorial Scholarship is given to one or more graduate students with demonstrated excellence in research.
- II. Outstanding Teaching Assistant Award is given to one or more graduate students with demonstrated excellence in teaching.
- III. Pick of the Year Award is given to a graduate student who has shown outstanding interest in the Program through involvement in activities, voluntary service, and good collegueship.
- IV. Outstanding Contributions Award is given to graduate students who have demonstrated excellence in Department and Program service.
- V. The Top and Runner-up Paper Awards are given to the students with outstanding presentations at the Geology Graduate Student Seminar, as decided by the entire Program faculty.

#### **Graduate College Awards**

The Graduate College has several awards available for graduate students. Students interested in being nominated should contact their Major Professor and the DOGE.

- I. One graduate student from each graduate program may be nominated in each semester (fall, spring, and summer) by the DOGE for the Research Excellence (REX) Award. This award recognizes students for outstanding research or creativity as seen in their theses

and dissertations. These students are also expected to be academically superior and able to not only do research but develop a well-written product. Awardees receive a certificate and cord to be worn during graduation.

- II. The Karas Award for Outstanding Dissertations is offered each spring semester to recognize a superior mathematical and physical sciences and engineering or social sciences dissertation. The two disciplinary areas for consideration in odd years are Humanities and Fine Arts and Biological Sciences. The two disciplinary areas for consideration in even years are Mathematical and Physical Science and Engineering Social Sciences. The award amount will be \$1,000 for each dissertation award winner. Award winners are expected to be available to receive the award in person.
- III. The Zaffarano Prize for Graduate Student Research is offered each spring semester: to recognize superior performance in publishable research by an ISU graduate student. Publishable research is defined as work written and accepted for publication in a national or international refereed journal. Both the quality and the number of publications produced while a student at ISU will be considered. Nominees must either be currently enrolled at ISU or have graduated in the 2 preceding terms.
- IV. Three Minute Thesis (3MT) celebrates the exciting research conducted by master's or Ph.D. students around the world. Developed by The University of Queensland, the competition cultivates students' academic, presentation, and research communication skills. Presenting in a 3MT competition increases students' capacity to explain their research in three minutes in a language appropriate to a non-specialist audience. Competitors are allowed one PowerPoint slide, but no other resources or props.

### **Graduate and Professional Student Senate (GPSS)**

The GPSS gives awards in teaching, research, and leadership. Multiple awards in each category are given each year. Selected graduate/professional student recipients are presented certificate and a financial award at the annual GPSS spring Conference. This amount is subject to change on a yearly basis.

### **Disciplinary Awards**

Many societies and journals also offer awards to students. Below is a list of a few that may be relevant. Students are encouraged to investigate possible awards through scientific societies, journals, or conferences.

- I. The Society for Exploration Geophysicists (SEG) awards a \$250 prize for the [best student chapter article](#) in the near-surface geophysics newsletter *Near Surface Views*.
- II. The American Geophysical Union (AGU) [Mineral and Rock Physics Graduate Research Award](#) is presented annually to one or more promising young scientists and recognizes outstanding contributions to the field of mineral and rock physics achieved during the honoree's Ph.D. research.
- III. The Geological Society of America (GSA) disciplinary Divisions give awards for student presentations at the annual GSA meetings. For example, the [Geobiology and Geomicrobiology Division](#) or the [Geophysics and Geodynamics Division](#).

### **Travel Grants**

Graduate students are strongly encouraged to give at least one presentation at a scientific meeting prior to graduation. Although your Major Professor may be able to provide funds to cover research and travel costs associated with your research project, this may not always be the case. Students should attempt to support the costs by applying for grants from various sources. Grants that have been commonly awarded to students are listed below. Always talk to your Major Professor about grants that are specific to your field before applying.

## **Graduate Student Professional Advancement Grants (PAG)**

The [PAG](#) is provided for ISU graduate students by the Graduate College and the GPSS. Funds may be granted for professional meetings and conference travel. For eligibility, deadlines, and the application, please see the [PAG](#) webpage.

Each graduate student is eligible to receive one PAG per fiscal year (July 1 through June 30). Each request must be approved by the Major Professor, Chair, and Academic Dean. Applications should be submitted as early in the Fall and Spring semesters as possible as funds are usually depleted by November 15 for the Fall funding period and April 1 for the Spring funding period. The forms are found at <http://www.gpss.iastate.edu/professional-advancement-grants>.

## **Departmental Travel Support**

Students who are traveling to a professional meeting are eligible to receive direct support from the Program (\$300) if they are giving a presentation at the meeting and have applied for a PAG. Interested students should apply to the Department.

## **Society and Conference Travel Support**

Many conferences and societies provide travel awards to graduate students. In addition, some meetings provide free or reduced registration for volunteering to help run the meeting. Below is a list of a few resources, but students should also check with their society or conference.

- I. The AGU [Fall Meeting Student Travel Grants](#) provide funds to assist students with a combination of costs associated with attending the Fall Meeting. Both in-person and virtual attendees receive \$1,000 USD toward the cost of registration and educational expenses. Applications will open the first week of July.
- II. AGU [Frontiers in Hydrology Meeting Early Career Travel Grant](#) provides financial assistance to those attending the Frontiers In Hydrology Meeting. All early career professionals attending the meeting may apply, but preference is given to applicants from historically marginalized communities or vulnerable populations. Awards will be given in the amount of \$1000 USD, with both in-person and virtual attendees eligible to apply.
- III. The Center for Global and Regional Environmental Research (CGRER) [Graduate Student Travel Awards](#) for Presenting and Attending Meetings and Conferences. These funds are available to support CGRER members' graduate student advisees' travel to present at meetings and conferences in their fields of related study within one year after the application date. Graduate students who are working in the areas of environmental global change and environmental sciences are qualified to apply.

## **Research Grants**

Many organizations and societies provide research grants for graduate students. Below is a list of a few resources, but students should also check with their society or conference.

- I. The primary role of the GSA [research grants program](#) is to provide partial support of master's and doctoral thesis research in the geological sciences for graduate students enrolled in universities in the United States, Canada, Mexico and Central America. In 2022, \$784,655 was awarded to 341 graduate students (~59% of the 578 who applied), with an average grant of \$2,301.
- II. The American Association of Petroleum Geologists (AAPG) Foundation [Grants-in-Aid](#) provides financial assistance to graduate students (currently enrolled in M.S. or Ph.D. programs) whose thesis research has application to the search for and development of petroleum and energy-mineral resources, and/or to related environmental geology issues. Grants are based on merit and, in part, on the financial needs of the applicant.
- III. The SEG [Near Surface Geophysical Research Award](#) provides research grants to support undergraduate or graduate students in good standing and enrolled in a relevant academic program at an accredited institution. can be applied for from January to March annually.

- IV. The Society of Economic Geologists (SEG) [Graduate Student Fellowship](#) Program provides one-year fellowships, ranging from US\$2,500 to US\$10,000, are awarded each year to students who intend to pursue a course of study in economic geology leading to a Professional Master's, Master of Science (M.Sc.) and/or Ph.D. degree.
- V. The Mineralogical Society of America (MSA) has two research grants that students are also eligible to apply for: the [Research in Crystallography Award](#) and the [Student Research in Mineralogy and Petrology grant](#).
- VI. [Dr. Thomas C. Winter Graduate Student Research Award](#) is managed by the GSA Foundation and is named in honor of the late Dr. Thomas Winter. It supports research grants for graduate students working in hydrogeology/hydrology.
- VII. The [Iowa Space Grant Consortium](#) (ISGC) awards fellowships to support outstanding graduate students at Iowa and Iowa State pursuing research opportunities in science, technology, engineering, and math (STEM) disciplines that support the mission of the National Aeronautics and Space Administration (NASA).
- VIII. The Continental Scientific Drilling (CSD) Facility at the University of Minnesota invites applications to a [competitive award program for graduate students](#) working with core samples from continental localities, including lakes. These \$1000 grants can be used to support student travel to Minneapolis, core shipment, lodging while at the facility, lab fees, and supplies consumed in [initial core description \(ICD\)](#).

## Fellowships

Fellowships provide financial support that generally includes stipend and may also include research funding. Federal agencies often provide graduate student fellowships, but others may be available through private foundations. Below is a list of a few resources, but students should do additional searches for fellowships that may target specific disciplines or populations.

- I. The purpose of the National Science Foundation (NSF) [Graduate Research Fellowship Program \(GRFP\)](#) is to ensure the quality, vitality, and diversity of the scientific and engineering workforce of the United States. GRFP seeks to broaden participation in science and engineering of underrepresented groups, including women, minorities, persons with disabilities, and veterans. The five-year fellowship provides three years of financial support inclusive of an annual stipend of \$37,000.
- II. [Future Investigators in NASA Earth and Space Science and Technology \(FINESST F.5\)](#) solicits proposals from accredited U.S. universities and other eligible organizations for graduate student-designed and performed research projects that contribute to the Science Mission Directorate's (SMD) science, technology, and exploration goals. The graduate student shall have the primary initiative to define the proposed FINESST research project and must be the primary author, with input or supervision from the proposal's Principal Investigator (PI) or mentor, as appropriate. The proposal must present a well-defined research problem/activity and a justification of its scientific significance to NASA. FINESST awards are research grants for up to three years and up to \$50K per year.
- III. The American Geosciences Institute (AGI) offers the [Harriet Evelyn Wallace Scholarship for Women Geoscience Graduate Students](#). Applications are open to all women pursuing a Master's or Doctoral degree in the geosciences. The successful applicant will be a thesis-based, full-time student and must be a U.S. citizen or permanent resident. The Harriet Evelyn Wallace Scholarship is solely merit-based and applicants will be evaluated on their probability of successfully completing a geoscience graduate program and transitioning into the geoscience profession following graduation.
- IV. [Ford Foundation Fellowships](#) provide support for predoctoral, dissertation, and postdoctoral study. The program seeks to increase the diversity of the nation's college and university faculties by increasing their ethnic and racial diversity, maximize the educational benefits of diversity, and increase the number of professors who can and will use diversity as a resource for enriching the education of all students.

