BOISE STATE UNIVERSITY

Graduate Student Handbook: Geoscience Degree Programs

Department of Geosciences

Boise State University

Revised: October 2021 by GPC

Introduction

This graduate student handbook is intended as a supplement to official university publications such as the *Boise State University Graduate Catalog* and the *Standards for Preparation of Dissertation, Theses, and Projects.* The purpose of this handbook is to provide students and faculty with information about the required curriculum, timeline, and policies of the graduate programs administered by the Department of Geosciences. Specifically, this handbook covers the following degree programs:

- M.S. Geophysics
- M.S. Geosciences
- M.S. Hydrologic Sciences
- Ph.D. Geophysics
- Ph.D. Geosciences

The Department of Geosciences also offers a non-thesis-focused Master of Earth Science (M.E.Sci.) degree. More information on this program, including its curricular requirements, can be found in the *Boise State University Graduate Catalog*.

While efforts are made to keep this handbook current, it is the student's responsibility to stay informed of changes in the Graduate College and Graduate Program policies and regulations. This handbook is updated as of **October 2021**. For more up-to-date information and links to current forms, both within the department and university, refer to the graduate student resources page at https://www.boisestate.edu/earth/graduate-student-resources/.

Returning students will notice modifications in this handbook compared to previous versions. While incoming students should follow policies herein returning students may either use this handbook or the version for the year in which they began.

Description of Geoscience Graduate Degrees

The degree programs encompassed by this handbook are research-based degrees and incorporate advanced coursework. Admission to these programs is based on the compatibility of the applicant's research interests with those of a prospective primary advisor, the availability of support (assistantships), and the applicant's academic preparation and potential. Students admitted into Ph.D. programs are expected to produce a written dissertation based on original research carried out by the student. The dissertation should make significant contributions to the body of scientific knowledge and be of sufficient quality to warrant the equivalent of approximately three publications in peer-reviewed scientific journals. Students admitted into M.S. programs are expected to produce a written thesis based on original research carried out by the student and ideally lead to publication in a peer-reviewed scientific journal. The M.S. thesis may be more narrowly focused and limited in scope than a Ph.D. dissertation, and contributions to the body of scientific knowledge may consist of application of current theory, extension of analytical methods to novel systems, and/or application of existing analytical approaches to extant datasets.

Following the completion of a written M.S. thesis or Ph.D. dissertation, the student must give a public presentation of the research and successfully pass an oral defense of the work.

Department of Geosciences Assistantships

The Department of Geosciences is able to fund graduate students through Research Assistantships (RAs), Graduate Assistantships (GAs), or a combination of the two over the course of a graduate student's tenure. Both RAs and GAs sign contracts for nine month periods and these positions generally entail tuition waivers, stipends, and health insurance. Continuing funding is contingent upon financial need, satisfactory progress of their degree program, and availability of funds. Students should read the terms of their contract letter carefully to make certain there are no misunderstandings about the length of support or conditions for remaining in good standing. While GA support is not generally available during three months of summer research efforts may be compensated by a primary advisor if grant money is available.

Department-funded GAs carry a responsibility of providing up to 20 hours of service to the Department per week, most often in the form of serving as a Teaching Assistant (TA) for two or more sections of a class. Assignment of Teaching Assistants to classes and sections occurs prior to the Fall and Spring semester and is coordinated by the chair of the Department of Geosciences. Program. Policy prohibits students on GAs from accepting additional employment without the written approval of the primary advisor and the program. GAs may seek extramural funding and job opportunities during the summer months if it is in their professional or personal interest.

Research assistantships (RAs) funded by research grants also support many students. The terms of such assistantships will depend on the amount of funding available and the terms of the grant. The principal investigator of the grant or primary advisor can provide details of expectations for students funded with RAs.

Terminology used in this handbook

The ***Department of Geosciences*** is in the College of Arts and Sciences (COAS) at Boise State University. Six graduate degree programs (including five with thesis/dissertation requirements) are administered by the Department of Geosciences. Graduate courses offered by the department have either GEOPH, GEOS, or GEOG as a prefix. Graduate students may enroll in classes with either prefix to fulfill geology, hydrology, and geophysics degree programs. The Department of Geosciences is led by a rotating ***department chair*** who generally serves a three-year term.

The ***Graduate College*** is a university-wide office that handles policy and procedures common to all graduate students. The Graduate College is led by a ***dean***.

The ***primary advisor*** is usually the individual who most closely works with the student in their research capacity. A primary advisor outside of the department may be endorsed to advise a graduate student within the Department of Geosciences, however an ***administrative advisor*** (from within the Department of Geosciences) must also be on the ***Supervisory Committee***. Eligible administrative advisors are provided in the current ***Boise State University Graduate Catalog***.

The ***Supervisory Committee*** is a group of 3 to 5 faculty or professionals who advise, give feedback, and ultimately approve the thesis or dissertation of the graduate student. Non-BSU faculty may serve on graduate student committees with approval from the Graduate College so long as they represent a minority of the committee.

The ***Graduate Program Committee (GPC)*** is a group of (usually) three regular Department of Geosciences faculty members who rotate through the position. They are responsible for assuring that students, advisors, and committee members comply with graduate student policies outlined in this handbook and in the graduate student catalog. They also liaison between the Department and the Graduate College. They can be used as a resource and should be consulted if issues arise with the ***Supervisory Committee*** or ***Graduate College***.

Orientations

New Students

All new graduate students are required to attend program orientations held during their first semester. In the fall semester these orientations include:

1) introductions of faculty/staff/students made during the first meeting of *Graduate Seminar* (held as part of GEOS598)
2) orientation provided in Introduction to Research Program Development (GEOS601) offered in the Fall each year.
3) teaching orientation required of students who are funded or partially funded on GA lines. This orientation includes a formal meeting held by the Graduate College during the week prior to first classes. Additional teaching orientations may also be provided internally by the department.
4) onboarding meeting with GPC member(s) in the middle of the first semester (initiated by GPC)

While most graduate students begin their programs during the fall semester it is not uncommon for some students to start in the winter semester or summer. For students admitted off-cycle (in January) the primary advisor is responsible for conveying critical orientation materials. These students should also reach out and arrange to meet with the *GPC* for an introduction during their first month on campus.

Returning Students

1) introductions of faculty/staff/students made during the first meeting of *Graduate Seminar* (held as part of GEOS598)
2) teaching orientation for first-time GAs is obligatory and is recommended for students who have previously had TA support. This orientation includes a formal meeting held by the Graduate College during the week just prior to first classes. Additional teaching orientations may also be provided internally by the department.
3) yearly GPC check-in as a part of group meetings (initiated by GPC)

Student Responsibilities

General

The Department of Geosciences will provide the necessary tools and the environment for the student's growth and professional development. The primary advisor has the responsibility for regular mentoring of their students. The student is responsible for understanding all deadlines and academic requirements and initiating a process of regular communication with the primary advisor and supervisory committee. Additionally a student is responsible for:

- Completing all forms and paperwork required of all graduate students at Boise State in advance of appropriate deadlines
- Completing all forms and paperwork required of Department of Geosciences graduate students
- Checking email regularly. Email is the primary professional correspondence used in the Department of Geosciences and for Boise State University business. Graduate students will generally be given both a student address (student_name@u.boisestate.edu) and employee accounts (student_name@boisestate.edu). It is the obligation of the student to check both accounts and initiate email forwarding between accounts as needed. The employee email address should be used primarily for professional correspondences.
- Working with the primary advisor, committee members, and Graduate Program Committee to ensure that all degree requirements are met in a timely manner.
- Forming a supervisory committee in the first year, meeting with the committee semesterly, registering for GEOS/GEOPH593 or GEOS/GEOPH693 for research credits and submitting a progress assurance form semesterly to the committee.
- Spending appropriate amounts of time each semester for research activities, course work, and (if applicable) teaching. Full-time graduate students should expect to devote 40 hours of effort per week on these activities, although in some cases more time may be needed, and on a schedule dictated by the needs of the research.
- Participating in synergistic scholarly and outreach activities such as attending and presenting at conferences and communicating science through publication, seminars, and educational outreach opportunities.
- Representing the shared values and mission statement of the Department of Geosciences (see https://www.boisestate.edu/earth/)
- Planning for and registering for classes in a timely manner and remaining in good academic standing, which includes maintaining a minimum 3.0 GPA

Curricular Expectations

Careful planning at the start of the graduate program is essential for a student to complete program requirements in a timely manner. Up-to-date descriptions of curricular requirements for a student's particular degree program are provided in the Graduate Student Catalog (https://www.boisestate.edu/graduatecatalog/) and within the section focused on the Department of Geosciences. Students must refer to the list of curricular requirements for their degree program. Students should use the catalog guidelines for the academic year they were admitted, however with permission from the Supervisory Committee they may petition the GPC for another year's catalog.

Some graduate students may consider satisfying curriculum requirements using transfer credits from another university. This is permitted with successful submission and approval of a Request for Approval of Transfer Credit Request form the Graduate College pages (https://www.boisestate.edu/graduatecollege/). More than half the total degree credits need to be completed at BSU.

A minimum registration of 9 credit hours (per semester) is needed for Department of Geosciences graduate students to maintain their benefits and funding, however students are allowed to register for up to a maximum of 16 credit hours per semester. Registering for more than 12 credit hours, however, is not generally recommended and should only be allowed following discussion with the primary advisor. Students also should seek approval to register for classes at the 300-level (or lower) and for classes that could be construed as unrelated to the course-of-study (e.g., art, music, language). In their final semester some students may choose to register for only 1 credit hour in order to present their thesis and dissertation. Students do not need to register for classes in summer unless they are planning to graduate. During the semester of graduation (including summer) students must sign up for 1 credit of GEOS/GEOPH593 or GEOS/GEOPH693.

A few classes are required for all graduate students:

- GEOS601 (2 credits; fall semester first semester or fall semester second semester for those starting in January) - *Introduction to Research Program Development* covers student orientation, work-life balance, career development, and introduction to research.
- GEOS598 (1 credit; expected registration every semester) - *Graduate Seminar* provides weekly opportunity for students to attend seminars and learn from presentations given by Earth systems scientists and practitioners.

The following class is required for thesis-producing M.S. students:

- GEOS593 or GEOPH593 (variable credit; every semester) - *M.S. research.* Students sign up for variable credit with their primary administrative advisor. As part of GEOS/GEOPH593 students must meet regularly with their advisor and at least once per semester with their committee. As part of this class students will fill out a Progress Assurance Form in the last month of the semester and provide it to their committee. Satisfactory progress results in a provisional passing grade (IP) awarded by their advisor. These IP grades become a passing grade when the thesis is accepted.
- A special case of GEOS/GEOPH593 (variable credit) is in the second semester of the M.S. program when students present their proposal for research in written form to their committee and in oral form to the Department of Geosciences community. Full details and expectations for the ***Masters Thesis Proposal*** are provided as an appendix in this handbook.

Required curriculum for dissertation-focused Ph.D. programs includes:

- GEOS693 or GEOPH693 (variable credit; every semester) - *Ph.D. research.* Students sign up for variable credit with their primary administrative advisor. As part of GEOS/GEOPH593 students must meet regularly with their advisor and at least once per semester with their committee. As part of this class students will fill out a Progress Assurance Form in the last month of the semester and provide it to their committee for review. Satisfactory progress results in a provisional passing grade (IP) awarded by their advisor. These IP grades become a passing grade when the dissertation is accepted.
- GEOS687 or GEOPH687 (1 credit; usually taken in 3rd semester of Ph.D.) - *Doctoral preliminary exam* is a written test conducted over the course of one week during the first month of the 3rd semester. Preparation for the preliminary exam begins during the student's 2nd semester. Full details for the *Doctoral Preliminary Exam* are provided as an appendix in this handbook. The outcome of the preliminary exam, a prerequisite for the comprehensive exam (GEOS691), is Pass/Fail.
- GEOS691 (1 credit; usually taken in 4th semester of Ph.D.) - *Doctoral comprehensive exam*. Students present work already accomplished and their proposal for continuing research. Registration for GEOS691 is contingent upon a successful pass in GEOS/GEOPH687. Full details for the *Doctoral Comprehensive Exam* are provided as an appendix in this handbook. The passing outcome of the comprehensive exam permits students to continue in the Ph.D. program and apply for candidacy through the Graduate College.

Students are encouraged to register for at least 1 credit hour of research (either M.S. or Ph.D.) each semester *unless* total credit hours will exceed 12.

Advising

Primary Advisor Role

The *primary advisor* assumes the responsibility for day-to-day mentoring and professional development of their students. The advisor is identified during the review of the student's graduate application and must be assigned before admission. To chair a graduate committee, the primary advisor must be a member of the university's graduate faculty and hold an appointment in the Department of Geosciences. Alternatively, a faculty member outside the Department of Geosciences may serve as primary advisor if they have an endorsement from the Department of Geosciences to chair a committee and if a Department of Geosciences faculty member agrees to serve on the committee and act as an *administrative advisor*. The GPC approves of primary advisor selection and *administrative advisor* (if relevant) during the acceptance process.

Appointment of Supervisory Committee

The Supervisory Committee is charged with general guidance of the graduate student, including design and approval of the program of study, approval of research proposals (for M.S. students), administration of the preliminary and comprehensive examinations (for Ph.D. students), supervision and feedback on research progress, and participation in the thesis or dissertation defense.

The Supervisory Committee consists of a primary advisor who serves as chair, and at least two additional members (for M.S. programs) and three additional members (for Ph.D. programs). Students are encouraged to have a member of their committee who is external to the advisor's department. Students should form a Supervisory Committee during their first semester of enrollment in the graduate program. Composition of the committee should be based on a reasonable match between student and faculty academic interest. Selection of the committee typically begins with the graduate student and primary advisor agreeing on appropriate committee membership. The student then contacts and meets with potential members to determine their availability to serve on the committee. Once a committee has been identified, a Supervisory Committee Appointment Form must be submitted through the Graduate College. The form will then be routed to the GPC and to the Graduate College for approval. A change in composition of the committee can be made after its appointment, but only in accordance with program policies and the approval of the Graduate College.

It is highly encouraged for students to assemble and meet with their Supervisory Committee by the end of the first semester.

Mentoring Strategies

The primary advisor is principally involved in mentoring, but all supervisory committee members are also available to provide additional support and guidance. Formally, mentoring occurs as part of M.S. or Ph.D. research credits (GEOS/GEOPH593 or GEOS/GEOPH693). As part of this course students will plan to meet formally with their entire committee at least once per semester to report on progress. This meeting may be held at any time during the semester. Students should register for at least 1 credit hour of research (either M.S. or Ph.D.).

In addition - and as part of GEOS/GEOPH593 or GEOS/GEOPH693 - the student is responsible for presenting a completed *Progress Assurance Form* to their entire committee for review and discussion. The Progress Assurance Form is a short document highlighting various benchmarks and also allows students to optionally answer longer-form questions. The advisor will retain the form and consult with the GPC if there are any issues that need to be addressed. The Progress Assurance Form should ideally be completed within the last month of the semester and can be reviewed during a committee meeting or with the primary advsior. An in-progress passing grade (IP) is given to students who are making satisfactory progress with their research. These grades become a pass (P) when the thesis or dissertation is complete and approved in the student's last semester.

Students are highly encouraged to proactively engage with their supervisory committee and with their primary advisor. Regular (weekly) meetings with the primary advisor is typical for Department of Geosciences graduate students.

Occasionally a student, or faculty, may seek to change the composition of the supervisory committee or even a primary advisor. In this case, the GPC will become involved and facilitate the transition by means of a formal petition. The ability to make changes depends upon mutual agreement of students, faculty, and GPC, and the availability of suitable funding to support the student if there is a change in primary advisor.

Very occasionally a student or faculty may decide that a change of academic program (within the Department of Geosciences) is appropriate. Examples may include Ph.D. students who fail a preliminary or comprehensive exam or students who decide not to pursue a dissertation or thesis. In these cases the Primary Advisor, Supervisory Committee, and GPC will consult with the student to assess whether a change in degree program is possible.

Admission to Candidacy

Admission to candidacy is required by all degree-seeking graduate students and serves as an essential intermediate check that a program's curriculum requirements will be satisfied. Candidacy should be pursued as soon as a student has passed at least one-half of the total credit requirements of the program and completed their thesis proposal defense (for M.S. students) and preliminary and comprehensive exams (for Ph.D. students). Typically candidacy is sought in the third semester for M.S. Students and in the fifth semester for Ph.D. students.

Students submit an Application for Admission to Candidacy to the Graduate College for their assessment of compliance. The Graduate College will check to see that curriculum satisfies the requirements of the student's program in the Graduate Student Catalog. Any transfer credits to be applied to a degree program (requested using Graduate College forms) must be approved prior to the request for candidacy. An approved Application for Admission to Candidacy is a binding agreement between the student and university. Any subsequent changes to coursework requires approval by the Supervisory Committee, GPC, and the Graduate College.

It is the responsibility of the graduate student to review credit requirements for their respective degree program for the graduate catalog corresponding to the year of their enrollment.

M.S. Programs Specific Details

M.S. Thesis Proposal (part of GEOS597 or GEOPH597)

An important benchmark for M.S. students is the thesis proposal in the second semester of the first year. This effort is designed to help focus students for their upcoming research and provide an opportunity for both writing and oral presentation practice.

Students must submit to their Supervisory Committee a written thesis proposal describing in sufficient detail the proposed scope of work, anticipated impact, timeline, and a plan for obtaining and utilizing the resources necessary to complete the research. A complete draft proposal is evaluated by the committee and returned to the student with comments and suggestions for possible revision. M.S. students are required to give a 15-20 minute public presentation of the thesis proposal, allowing for 5-10 minutes of audience questions.

A satisfactory thesis proposal is graded as a pass by the supervisory committee and is accompanied by a letter or email of confirmation from the primary advisor. The letter may contain a request for more information or stipulations for students enrollment in directed curriculum. A satisfactory result is assigned as a grade of "in progress (IP)" for GEOS597/GEOPH597 for the semester when the thesis proposal is given.

Appropriate planning and communication with the primary advisor is needed for the thesis proposal, which includes background literature review and initial data collection or analysis. Scheduling of the oral proposal generally happens during the regular seminar times (GEOS598) and in the second half of the semester (e.g., after spring break for spring semester). Students are responsible for scheduling their presentation in advance, confirming that all supervisory committee members are available, and delivering a final text version of the thesis proposal to their committee *at least one week* prior to their presentation. A suggested proposal outline for preparation of the written proposals is given as an appendix in this handbook.

M.S. Thesis Defense Procedures

As students begin to draft their thesis they should familiarize themselves with the Graduate College's webpages on *Standards for Preparation of Dissertation,Theses and Projects.* These pages describe in detail formatting requirements, and deadlines and procedures for submission of theses as well as contacts of Graduate College staff who can help with questions related to thesis preparation.

A public defense of the M.S. thesis is held in the student's last semester after the Supervisory Committee has reviewed a final version of the thesis, which must be distributed *at least four weeks prior* to the defense. A final version of a thesis should be authorized by the primary advisor prior for distribution to the supervisory committee. This draft need not be in graduate-college approved format, but it must be complete. The reason for this timeline is to allow the Supervisory Committee ample opportunity to review the final thesis draft prior to the oral component of the defense. The entire supervisory committee must review the thesis at least *two weeks* prior to the defense date and jointly authorize the oral presentation to go forward. Notification of the event is then provided to the Graduate College by completing a *Graduate Student Notification Form* to be submitted at least two weeks prior to the defense date. Failure by any parties to abide

by these deadlines may result in rescheduling of an oral defense and impact a student's ability to graduate on time.

An intent to graduate and give an oral defense should be discussed with the entire supervisory committee during a student's penultimate semester. The committee is well suited to evaluate whether the timeline for graduation is appropriate. Many students underestimate the time needed to provide the committee with the final thesis draft leading to overly optimistic thesis defense scheduling. Students should try to schedule their defense date by the beginning of the semester they intend to graduate and be aware of all Graduate College calendar deadlines for Thesis and Dissertation dates. Deadlines, which occur earlier in the semester than students may realize, include *intent to defend forms* (deadline during the first week of the semester) and last date to submit a thesis or dissertation (two thirds of the way through the semester).

Oral defenses are recommended as in-person presentations (when permitted) and via virtual link when necessary. The entire supervisory committee must be physically or virtually present and the date of the defense is determined jointly by the Supervisory Committee in compliance with the calendar of deadlines published by the Graduate College. Defenses should be scheduled for a time when the Department community can attend (e.g., during scheduled GEOS598 meeting times).

The oral presentation begins with a public oral presentation of the thesis followed by a closed-door defense of the thesis with the supervisory committee. After the defense, the chair/advisor of the defense committee calls for a vote to determine whether a student passes or fails. A passing grade is generally contingent upon completion of requested modifications to the thesis. A provisional passing grade decision can be provided on the day of the defense. Committee requests for revision are collated by the primary advisor and provided to the student in the form of a letter within one week of the oral defense. All revisions must then be made and stay within compliance of the calendar of deadlines published by the Graduate College.

As part of the thesis defense the student will need to print two forms and have them signed by all Supervisory Committee members. The first form is a final thesis approval form and the second is an oral defense approval form. The student is encouraged to collect signatures on the day of the defense, however the thesis approval form will not be signed and released by the primary advisor until they have seen and approved of the revised thesis document.

A student who fails the defense will be officially notified in writing and may be permitted to try again with approval from the supervisory committee and petition to the GPC.

The final version of the thesis or dissertation must be submitted to the Graduate College for approval by the Dean of Graduate Studies. Before final acceptance, it must conform to the standards of the Graduate College as determined by the thesis editor. Students should refer to the Standards and Guidelines for Theses and Dissertation page hosted by the Graduate College. Upon having the thesis accpeted a passing grade will be awarded for GEOS/GEOPH593 and previous semesters of GEOS/GEOPH593 will be changed by the registrar from IP to P.

Ph.D. Program Specific Details

Ph.D. Preliminary Exam (GEOS/GEOPH687)

The preliminary exam is an important tool used to assess a Ph.D. student's assimilation and synthesis of knowledge and skills needed for successful Ph.D. research activities. The week-long exam must be scheduled with approval of the supervisory committee for the first month of the student's third semester, however a delay in preliminary be exam be requested for extenuating circumstances (including if a student is entering the Ph.D. program directly from an undergraduate degree). The GPC will review the petition, which must be submitted by the student's second semester, and potentially authorize a delay.

The exam is written by supervisory committee members with each committee member providing one set of questions per day. The express goal is to assess a student's expertise in topical subjects related to the dissertation research and identify gaps in knowledge or curriculum that may need to be addressed. The supervisory committee is given some latitude in how to deliver the exam, but the student should expect one set of questions per committee member per day beginning on Monday and lasting through Thursday or Friday when the exam must be completed. In the case where a student has five committee members it is reasonable for two committee members to contribute to a single day's questions so that the test lasts only four days.

Each daily set of questions is intended to be open-book and open-resource and should be answerable by a well-prepared student in about four hours. The series of questions can be provided sequentially (at beginning of each day) or as a package at the beginning of the week at the discretion of the primary advisor and committee and with clear instructions provided to the student.

It is the obligation of the primary advisor to provide a study guide to the prospective student in the semester prior to the preliminary exam. These study guides include contributions from all committee members and are intended to facilitate preparation for the study exam questions. It is also the obligation of the primary advisor to provide committee feedback to the student and to the GPC within one week of completing the preliminary examination. This feedback entails corrected answers (from each committee member) and a written assessment of the test. This assessment can either be an unqualified pass, a pass requiring students to engage in remedial study (to account for identified deficiencies), an incomplete grade allowing students to retake the preliminary exam in the following semester, or a failing grade for which re-examination is not possible. In the case of a qualified pass or incomplete the student will sign the letter requesting the remedial actions and this will be retained as a contractual obligation by the dissertation advisor and the GPC chair.

Students and primary advisor should be aware that the grade for GEOS/GEOPH687 is reported by the GPC chair as P, F, or I.

Ph.D. Comprehensive Exam (GEOS691)

The comprehensive exam represents a significant milestone and an important assessment of whether the student is prepared to advance the body of knowledge in their field. GEOS691 is taken in the semester following the preliminary exam (often in 4th semester) and has both a written and oral component. A passing grade in the preliminary exam (GEOS/GEOPH687) is required as a prerequisite to enroll in

GEOS691. A passing grade in the comprehensive exam is required for Ph.D. students to advance to candidacy.

The PhD Comprehensive exam involves both a written and an oral component. Appropriate planning is needed for both tasks and regular communication with the primary advisor and supervisory committee is critical. Scheduling of the oral component generally happens during the regular seminar times (GEOS598) and in the second half of the semester (e.g., after spring break for spring semester). Students are responsible for scheduling their presentation in advance, confirming that all supervisory committee members are available, and delivering the text of the dissertation proposal to their committee *at least two weeks* prior to their presentation.

The oral component of the Comprehensive Exam consists of a public presentation (in-person or virtual) of the dissertation proposal and a private oral evaluation of the proposal with the Supervisory Committee. The public dissertation proposal presentation is a 35-40 minute presentation followed by 10-15 minutes of public questions. The private closed-door oral evaluation with the Supervisory Committee, which will include discussion of both the written and oral products, is scheduled directly following the oral presentation.

The written component of the Comprehensive Exam consists of the submission of a dissertation proposal to the Supervisory Committee. The dissertation proposal describes in sufficient detail the proposed scope of work, anticipated scientific impact, timeline, and a plan for obtaining and utilizing the resources necessary to complete the research. A complete proposal is evaluated by the committee and returned to the student with comments and suggestions for revision (if required). A suggested proposal outline for preparation of the written proposals are given as an appendix in this handbook.

It is the obligation of the primary advisor to provide committee feedback to the student and to the GPC within one week of completing the comprehensive examination. This assessment can either be an unqualified pass, a pass requiring students modify their curriculum plan of study, or a failing grade for which re-examination is not possible. Students and primary advisor should be aware that the grade for GEOS691 is reported by the GPC chair.

Ph.D. Dissertation Defense Procedures

This section outlines Department of Geoscience guidelines on Ph.D. dissertation defenses. Students should also refer to the Graduate College's webpages on *Standards for Preparation of Dissertation, Theses and Projects.* These pages describe in detail formatting requirements and procedures for submission of dissertation as well as contacts of staff who can help with questions related to dissertation preparation.

A public defense of the Ph.D. dissertation is held in the student's last semester after the Supervisory Committee has reviewed a final version of the dissertation, which must be distributed *at least four weeks prior* to the defense. A final version of the dissertation should be authorized by the primary advisor prior to distribution to the supervisory committee. This draft need not be in graduate-college approved format, but it must be complete. The reason for this timeline is to allow the Supervisory Committee ample opportunity to review the final dissertation draft prior to the oral component of the defense. The entire supervisory committee must review the dissertation at least *two weeks* prior to the defense date and jointly authorize the oral presentation to go forward. Notification of the event is then provided to the Graduate College by

completing a *Graduate Student Notification Form* to be submitted at least two weeks prior to the defense date. Failure by any parties to abide by these deadlines may result in rescheduling of an oral defense and impact a student's ability to graduate on time.

An intent to graduate and give an oral defense should be discussed with the entire supervisory committee during the student's penultimate semester. The committee is well suited to evaluate whether the timeline for graduation is appropriate. Many students underestimate the time needed to provide the committee with the final dissertation draft leading to overly optimistic thesis defense scheduling. Students should try to schedule their defense date by the beginning of the semester they intend to graduate and be cognizant of the Graduate College calendar for Thesis and Dissertation deadline dates. These deadlines occur earlier in the semester than most students realize and include intent to defend paperwork (deadline during the first week of the semester) and last date to submit a thesis or dissertation (generally two thirds of the way through the semester).

Oral defenses are recommended as in-person presentations (when permitted) and via virtual link when necessary. The entire supervisory committee must be physically or virtually present and the date of the defense is determined jointly by the Supervisory Committee in compliance with the calendar of deadlines published by the Graduate College. It is critical for students to schedule their defense early (ideally during the first week of the semester) and to find a time when the Department of Geoscience community can attend (e.g., during scheduled GEOS598 meeting times). The student must also notify the Graduate College of the defense date by completing a *Graduate Student Notification Form* at least two weeks in advance of the defense date.

An additional requirement for the Ph.D. defense is that a Graduate Faculty Representative (GFR) be involved. The GFR is a member of the Boise State University graduate faculty outside of the Department of Geosciences who has no association or vested interest in the work of the student. This individual's obligation is to observe the defense and verify protocol is followed such that the defense is a fair and objective process. It is the obligation of the student and the primary advisor to find a GFR willing to attend the public defense and subsequent private presentation. The Graduate College maintains a list of eligible GFRs who should be invited to participate well in advance of the oral presentation. The GFR will also initiate a formal vote to pass or fail the student at the conclusion of the closed-door defense.

The oral dissertation defense begins with a public oral presentation followed by a closed-door defense of the dissertation with the supervisory committee. After the defense, the chair/advisor of the defense committee calls for a vote to determine whether a student passes or fails. A passing grade is generally contingent upon completion of requested modifications to the dissertation. A provisional passing grade decision can be provided on the day of the defense, however a supervisory committee will typically make the passing grade contingent upon dissertation improvements or revisions. Requests for revisions are collated by the primary advisor and provided to the student in the form of a letter within one week of the oral defense. All revisions must then be finished promptly to stay within compliance of the calendar of deadlines published by the Graduate College.

A graduating student must provide two forms to be signed by all Supervisory Committee members. The first form is a final thesis approval form and the second is an oral defense approval form. The student is encouraged to collect signatures on the day of the defense, however the thesis approval form will not be released until the primary advisor has seen and approved of the revised dissertation document and signed the approval form. A student who fails the defense will be officially notified in writing and may be permitted to try again with approval from the supervisory committee and petition to the GPC.

The final version of the dissertation must be submitted to the Graduate College for approval by the Dean of Graduate Studies. Before submission, it must conform to the standards of the Graduate College as determined by the dissertation editor. Students should refer to the Standards and Guidelines for Theses and Dissertation page hosted by the Graduate College. Upon submitting the dissertation a passing grade will be awarded for GEOS/GEOPH693 and previous semesters of GEOS/GEOPH693 will be changed by the registrar from IP to P.

Academic Standing and Probation

GPA Requirements

Student performance in the classroom provides a measure of progress and achievement and is particularly important in the early portion of a student's program. All students admitted to the program must maintain a cumulative GPA of 3.00 (including for transfer and summer courses). If the cumulative GPA drops below 3.00 the Graduate College will take action and put a student on academic probation. If the next semester's GPA drops below 3.00 the student will be dismissed from the graduate program. Probation will continue until a student's cumulative GPA rises above 3.00. Graduate students will not be authorized to graduate unless their cumulative GPA is above 3.00. A student whose semester GPA is below 3.00 will be put on academic notice by the College of Arts and Sciences. Graduate courses (500 or 600-level) must be passed at a grade of C or better to count for program credit. Undergraduate classes (400-level) must be passed at a grade of B to count for program credit.

Incomplete Grades

A grade of I (*Incomplete*) is assigned when extenuating circumstances make it impossible for a student to complete a course before the end of the semester, subject to the requirement that the student has been in attendance and has done satisfactory work for most of the semester. In order to receive an incomplete on a graduate course, the student and instructor must agree to a contract which stipulates the work that is required and the time frame in which it must be completed for the student to receive a grade in the class.

Residency Requirements and Duration of Program

A Ph.D. student must spend at least one academic year in full-time, on-campus graduate study at Boise State University. Additional residency requirements can be imposed by the dissertation advisor as needed. The minimum duration of study for the Ph.D. degree is three academic years beyond the baccalaureate degree. All requirements for a Ph.D. degree, including courses completed at another college or university, must be started and completed within a single continuous interval of no more than ten years.

Appendices

MS Thesis Proposal

PhD Comprehensive Exam

Graduate Student Resources

MS Thesis Proposal Guidelines

Not all proposals will follow these guidelines precisely. Additional guidelines and rubrics for evaluations may be provided by the primary advisor.

Title: Your thesis proposal should have a title that informs the reader of the field of study and which specific aspect of the field your project addresses.

Abstract: The abstract should be a concisely written summary (not exceeding 350 words) of the project motivation and goals. State the big picture importance, essential question(s) being asked, your plan to address the question(s), and why the study is significant.

Introduction (1-2 pages): The purpose of the introduction is to provide a high-level definition of the problem or knowledge gap to be addressed, and provide a synopsis of the proposed thesis activities in their entirety. It should clearly communicate a scientific problem that needs to be understood, articulate why that problem is of broad importance, and give the reader some idea how you plan to make progress towards a better (but still imperfect) understanding of that problem. Specifically, the introduction should:

- define the overarching scientific problem;
- articulate why this problem is of significance, from potentially both scientific as well as societal perspectives;
- identify a gap in the current knowledge base that your research will address; note that this gap need not be (and perhaps should not be) large; this should be the increment to the scientific knowledge base that you contribute;
- pose the specific science questions that your research will answer;
- state in affirmative terms what
    - activities that will be conducted to address your research questions,
    - outputs that will be generated by those activities, and
    - new knowledge that will arise out of the analysis of those outputs.

Background (2-3 pages): This section is effectively an extension of the introduction that coincides with your literature review. Peer-reviewed papers should comprise the primary source of the cited literature. Hallmarks of a good literature review include:

- a synopsis of the contemporary and/or directly related pieces of literature, capturing some of the limitations and/or gaps in those previous studies;
- a summary of relevant review papers and/or scientific synopses (e.g., National Academies reports) that explicitly call for the kind of research being conducted;
- clearly demonstrate to the reader that the articulated knowledge gap exists and foreshadows the methodological approach that you will be taking.

Methods (2-3 pages): Provide a detailed overview of your research activities, the outputs of those activities, and how you will analyze and interpret those outputs. Note that this might not be known with certainty at this point, and some parts of the methods may be better conceived than others. That is okay - do your best to provide a "road-map" of your activities as you see them now so that your committee can provide meaningful feedback. Some specific and important items to consider including are:

- study area(s);
- detailed background on the models/modeling frameworks being used;

- detailed background on the datasets being used as input to your models or analyses; focus on those that might be non-standard or exert a significant influence on the outcomes of your experiments;
- detailed background on specific algorithms, statistical, and data analysis methods being employed; again, focus on those that might be non-standard or novel;
- detailed overview of the experimental setup and/or procedure, to the extent that it is known; specifically identify the variables to be analyzed and at what (spatio-temporal) resolution; identify any field data and metrics that will be used to assess model performance and data noise.

Think of each item above as a subsection, 1-2 paragraphs maximum each.

Preliminary Results (optional, 1-2 pages): Preliminary results should be provided when they are available and when they demonstrate a clear connection to the overarching aims of the thesis. The goal of providing even rough preliminary results is, in part, to demonstrate how you will communicate final results in the form of plots, summary tables, etc. This serves to prime your committee for what the outputs of your thesis experiments will potentially "look like" and can serve to facilitate discussion on how best to communicate and visualize those products.

Work Plan/Schedule: Provide a timetable that predicts the duration of each step necessary to complete the proposed project. The purpose of the work plan is to show that you have thought carefully through what needs to be done, how it can be done, and when it can be done. In practice, you will likely need to modify the work plan as your research proceeds, but establishing a plan from the outset can help you foresee and avoid potential difficulties.

PhD Comprehensive Exam Proposal Guidelines

Not all proposals will follow these guidelines precisely. Additional guidelines and rubrics for evaluations may be provided by the primary advisor.

Guiding philosophy: The dissertation proposal should clearly articulate to the supervisory committee the contribution of the proposed work to the scientific community. It is expected that the graduate student will consult with the supervisory committee in the preparation of this proposal, but the proposal and ideas contained therein must be an original work of the graduate student. The proposal document should identify a clear and feasible path to achieving the proposed contribution. Students should keep in mind that the product of their eventual dissertation work is approximately equivalent to three peer-reviewed journal articles. The dissertation proposal is an opportunity to outline the work and strategies necessary to achieve this goal.

Sections:

Title Page: Include working title of thesis, description, e.g., "Ph.D Geosciences Thesis Proposal" and date of submission to the supervisory committee.

Abstract Page (1 page): The abstract should be a concisely written summary (not exceeding 350 words) of the project motivation and goals. State the big picture importance, essential question(s) being asked, your plan to address the question(s), and why the study is significant. Intellectual merit and broader impacts should also be summarized following guidelines used in National Science Foundation-type research proposals.

Introduction (1 page): This section should provide the big picture motivation for the topic, the problem(s) to be addressed, and the scientific and societal significance of the problem. This section can include primary objectives, which should be measurable and achievable. Bulleted or numbered lists beginning with action verbs may be appropriate and are an effective way of communicating objectives.

Background (1.5-2.5 pages): This is a summary of the relevant and current understanding of the problem. Specifically a student may identify limitations in current understanding and potential avenues of improvement to the state-of-the-art.

Methods (4.5-5.5 pages): This section may be lengthy and provides an overview of the methods that the student will use to achieve research objectives. Figures are expected. It is appropriate to summarize work already done by the student as well as articulate the proposed work moving forward.

Expected Results (1 page): This is an outline of anticipated deliverables and may include results of analyses already performed. This is also the section to expound upon expected research outputs (e.g., papers including working titles, datasets, models, software, etc.). A timeline figure may be appropriate in this section. A data management plan for archival and dissemination of research products is also appropriate.

The total length of the main proposal document should be 10 pages with 1 inch margins using a fontsize between 11 and 12 and 1.5 or single spacing. Expectations are that the document must include tables and figures with appropriate captions. Figures must be appropriately annotated and numbered sequentially with

callouts from the text. References, which are not included in the page count, should be adequate and properly incorporated.

References (no limit): Proper formatting of reference list is required.

Appendices: Although these are allowed they must not contain information that is critical to the proposal narrative.

Department Resources

Much of the resource information contained in previous graduate student handbooks has been migrated to Department of Geosciences web pages in order to maintain this material to remain current and up to date. The following is a quick summary of primary resources and is subject to modification and removal in future handbooks.

Graduate Student Desk Space

Desk space in the Environmental Research Building (ERB) is assigned to all M.S. and Ph.D. students by the Department of Geosciences. Desk space will be assigned by the administration at the beginning of each Fall semester. From time to time it may be necessary to reassign desk space. When possible requests for certain locations, including proximity to advisors, will be accommodated.

Access to Building

Graduate students will have ID card entry access to the ERB building, but are responsible for working with their primary advisor and department administrative staff to gain access to any additional facilities (e.g., laboratory, field equipment, computational, etc.) needed to conduct their research.

Computers

Graduate students should inquire with their primary advisor and Systems Administrator James Nelson (jsnelson@boisestate.edu) to arrange access to a university-owned computers. Each graduate student should discuss with their major advisor how to access any specialized computing facilities that may be controlled by the Department of Geosciences, Research Computing Support, and/or the Office of Information Technology.

Printers, Photocopies, and Faxes

Networked photocopier/printer devices are available in the mailrooms of the 3rd, 4th, and 5th floors of the ERB. Additional printers are available for graduate student use in other areas of the ERB. Printers and photocopiers are connected to a Boise State username and password. Please inquire with Systems Administrator James Nelson (jsnelson@boisestate.edu) for details. Photocopies and printing should be limited to activities associated with dissertation research, graduate coursework, and teaching responsibilities. The Department of Geosciences has a poster printer typically used to produce posters for teaching and presenting research. Requests for printing can be made by contacting James Nelson (jsnelson@boisestate.edu).A fax machine (208-426-4061) is available in the main office of the Department of Geosciences.

Mail

Each graduate student has a mailbox located in the 4th floor mailroom of the ERB (ERB, room 4142). Packages can be picked up in the main office of the Department of Geosciences. Assistance with preparing labels and mailing FedEx packages for teaching/research is also available in the Department of Geosciences main office (ERB, Room 1160).

Graduate Student Awards and Travel Grants

Graduate students in good standing may apply for awards to travel to and attend scientific meetings if they are presenting. Partial support is generally granted on a needs-based assessment. Students should work with their primary advisor to find additional sources of support to attend meetings. The Graduate College also has a limited number of travel funding opportunities with application deadlines several times each year. For more information, see the Graduate College Travel Award site.

Additional awards and funding opportunities are available intermittently. These are generally announced by email and posted on the department website.