

# PhD Program Requirements in Earth Sciences

1. Read the Graduate School Rules for a Doctorate Degree! We have a couple of more restrictive requirements, but the graduate school requirements are a good place to start. [http://www.montana.edu/gradschool/cat\\_for\\_doc\\_stud.htm](http://www.montana.edu/gradschool/cat_for_doc_stud.htm) Graduate School Web Page is: <http://www.montana.edu/wwwdg/> in case the link above is dead.

2. Minimum requirements for the Ph.D. with a Master's degree\* in a relevant Earth Sciences field (e.g., geology, geography, GIS, paleontology, snow etc.):

- Minimum of 30 credits beyond the M.S. of which 18 must be dissertation research credits (ERTH 690)
- Minimum of 12 credits in content graduate courses relevant to the research focus; minimum of at least 8 credits must be taken within the Department of Earth Sciences.
- All students must take EARTH 594 (01) seminar during their first semester.
- The focus of this course is the development of your thesis proposal and review of regulations. Your thesis proposal will help you apply for internal and external grants in spring which may help with research support.
- All students must take at least two EARTH 594 (02) general seminar courses for credit

\* Note: Minimum requirements for a Master's degree include 20 course credits and 10 thesis credits.

3. Minimum requirements for the Ph.D. without a Master's degree, but with a bachelor's degree in a relevant Earth Sciences field:

- Minimum of 32 credits beyond the bachelor's degree of which 18 (minimum) must be research credits (ERTH 690)
- Minimum of 18 credits in content graduate courses relevant to the research focus; minimum of at least 12 credits must be taken within the Department of Earth Sciences
- A maximum of 9 pass/fail credits may be included for Ph.D. (excludes dissertation credits)

	Course	Thesis	Total	Maximum
	Credits	Credits		400 level
MS	20	10	30	9
Ph D. w/ MS	12	18	30	9
Ph D. w/O MS	32	28	60	9

**4. Graduate Committee:** Upon acceptance to the graduate program, you will be assigned an advisor based on the research interests submitted in your application. The thesis advisor must be a tenure track faculty member in the Department of Earth Sciences. A co-advisor may be appointed from among non-tenure track faculty in the department, adjunct faculty, or experts from external institutions or agencies. You must have at least 4 faculty members on your committee; in addition, the Graduate School will appoint an external member of the committee from the graduate faculty at MSU who must attend graduate exams and defenses as described below. Your committee should be appointed in the first term in residence at MSU.

**5. As per the Graduate School requirements, all doctoral students will be required to successfully pass the exams listed below. These include: 1) an oral qualifying exam during your first year, 2) a written/oral comprehensive exam your second year, and 3) an oral defense of your written dissertation during your final year. Satisfactory progress in the doctoral program is based on successful completion of these exams in the prescribed time frame. In the Department of Earth Sciences, no examinations are permitted to take place during the summer, and public defense presentations must be completed during the period of scheduled classes in the academic year, not during final exam week, not during holidays, and not during the summer.**

**1) The qualifying examination consists of an oral defense of a written research (dissertation) proposal and review paper before your doctoral committee during the first year of residence, typically late in the second semester of residence. The written component of the qualifying examination shall consist of 1) a dissertation proposal including a thorough literature review of the research problem and 2) an in-depth essay (review paper format, 5,000 – 10,000 words) on the trends and future directions of the candidates chosen field of study as defined by the dissertation chairperson and committee. The oral defense before the entire doctoral committee will cover the written dissertation proposal and also include questions on the written "trends and future directions" essay. Doctoral students are offered**

**only one opportunity to successfully pass the written qualifying exam and oral qualifying exam.**

**2) A written/oral comprehensive exam to be taken during the second year in the doctoral program and at least 1 semester before defending. The procedure for administering the comprehensive exam is as follows:**

- Four Graduate Committee members participate in the written component of the exam; the Graduate School Committee appointee does not participate in the written component. Although the Graduate School appointee does not submit questions for the written part, they must be present at the oral follow-up exam, as per Graduate School rules. In addition, they must be provided with copies of all of the written exam component questions in order to ascertain their degree of breadth, as required by the Graduate School.**
- The student speaks to each Committee member to ascertain what subject matter that member will hold them responsible for knowing. With this knowledge in hand, the student takes whatever time required for them to master all of the content areas they will be held responsible for as designated by the Committee members.**
- For the written portion of the comprehensive exam, each Committee member composes their questions and determines an amount of time that the student can have to answer their questions. This typically ranges from 2-4 hours; in cases in which either field or laboratory content is included in the written exam component, this may range up to 8 hours. The student's dissertation advisor collects the questions from each Committee member and then administers the exam over 4 days to their student (one Committee member exam component per day). In addition, the dissertation advisor must provide all of the written exam component questions to the Graduate School appointed Committee member, as required by the Graduate School. The student gives each completed exam component as completed to their dissertation advisor who then forwards it to the Committee member who wrote the questions.**
- This is followed by an oral exam that is focused on elaboration, elucidation, and (or) clarification of the written component. It is administered by the entire committee, including the Graduate School representative, over a 2-3 hour period of time. The Graduate School requires the entire Committee to be present at any oral exam (qualifying exam, comprehensive exam, and defense). If the entire committee is not present, the Graduate School will require the exam to be re-done. This is especially pertinent with respect to the Graduate School Committee appointees and off-campus/out-of-town Committee members. Off campus members may participate through a conference call. The oral component should**

be held within 2 weeks or less of the completion of the written component of the comprehensive exam.

- Based upon student overall performance on both the written and oral comprehensive exam components, the Committee will vote to either pass or fail the student. The decision is based on a majority vote.
- Dissertation defense with an in-depth oral presentation that is open to the public and a closed portion in which the committee examines the student. Off campus members may participate either in person or through a conference call.
- Your thesis topic is selected in consultation with your advisor and your committee. The topic may be part of a funded research project. If this is the case, the Department requires that you sign a letter of agreement between the principal investigator and the student which outlines the ownership of data, the scope of the thesis with respect to the grant, and the number of hours per week the student must work on the grant separate from the time dedicated to the thesis, and the relationship between grant and the thesis.

#### **6. Other requirements and information:**

- The philosophy behind a doctoral degree is independent, focused, intense research in a specific field that makes a fundamentally new contribution to the corpus of knowledge of that discipline. This is typically demonstrated by publication of 2-3 refereed journal articles, or scholarly, creative equivalents, that derive from the dissertation research.
- The major professor and student's graduate committee will determine additional specific course requirements for completion of the Doctor of Philosophy degree. In some cases, competency in a foreign language may be required by the student's graduate committee.
- A minimum of 2/3 of the content course credits must be taken from MSU-Bozeman.
- Ph.D. committees shall consist of a minimum of four faculty members plus a Graduate Representative. The Graduate Representative is selected by the College of Graduate Studies to monitor and insure compliance with the policies and regulations of the college, as well as insure that committee meetings are conducted in a fair and satisfactory manner.
  - Ph.D. candidates must submit their a) program of study and b) committee to the Graduate School by the end of the first semester of study.
  - Failure to submit your program of study by the end of your second semester will result in termination of graduate standing at MSU.

- **Ph.D. candidates are required to present, in addition to their dissertation defense, a minimum of one talk on their research in the Department of Earth Sciences seminar program, approximately halfway through their course of study.**
- **Note: Your degree will be a Ph.D. in Earth Sciences. No specialty area such as geography, geology, paleontology, GIS, or snow science will be on your transcript or degree.**
- **Ph.D. candidates are required to be thoroughly familiar with all information and requirements outlined in the Graduate Catalog and The Graduate School website and are responsible for meeting all dates and deadlines.**
- **Approval of the dissertation will be defined by the signature of the Graduate Dean only after the dissertation has been judged to meet all expectations. A dissertation is considered completed when accepted by the MSU Library in an electronic format.**
- **Ph.D. candidates must then provide, via email to the front office staff the link to this electronic file to be posted to the department website. A CD copy of the thesis is also to be provided to the main office of the department.**

## **7. Graduate Support via Teaching and Research Assistantships.**

**You may have the opportunity to receive a TA or RA appointment either upon acceptance, or during your graduate work in the department. These appointments are made at 0.5 FTE (expected work effort is ~20 hours/week to be determined with your advisor). Students with a TA or RA award**

- **Are entitled to in-state tuition during their appointment periods;**
- **Up to 30 hours tuition will be paid for by the department or research funding sources; and**
- **Be aware that you are responsible for paying for academic fees and benefits such as health care (applies to TAs and possibly for RAs— check with your advisor).**

## **8. Responsibilities**

**You are responsible for compliance with deadlines with other offices on campus such as student financial aid, the graduate school, student accounts, and others as notified. For example, Student Accounts must be notified each term that you plan to be in attendance so that financial aid or stipends can be disbursed.**

## **9. Standing in the Department**

**Failure to comply with the rules outlined above from the Graduate School and the Department will mean that you are not a student in good standing. This may impact: awards of TA positions, access to departmental support (e.g. travel), and recognition through awards.**

