



## Ph.D. Degree Requirements

General requirements for The University of Arizona Graduate Programs are described on the [Graduate College Program Requirements](#) web page. Below are listed specific requirements for doctoral degree from the Department of Planetary Sciences.

### Program of Study

The program of study includes coursework in planetary science and a minor field of study, a qualifying examination, and a Ph.D. dissertation. All elements must be approved by the student's Ph.D. and minor committees, as appropriate, and must conform to Department of Planetary Sciences (PTYS) and University of Arizona Graduate College requirements. Students are guided through their program of study by their Dissertation Advisor and their Minor Advisor, who chair their Ph.D. Committee and Minor Committee, respectively. In addition, the Graduate Admissions and Advising Committee (GAAC) is available to assist students at any stage in their graduate careers.

### Time Limits

The Ph.D. must be completed within 5 years of passing the Oral Comprehensive Examination. The Oral Comprehensive Exam must be attempted **before the end of their sixth semester since initial enrollment**. In extraordinary cases exceptions may be granted following department approval and petition to the Graduate College.

### Coursework

Students are required to complete 63 units of graduate coursework (500-level and above) consisting of

- **Twelve** units of core courses in Planetary Sciences. Students must choose at least 2 core courses (6 units) from the Physics group, 1 core course (3 units) from the Chemistry group, and 1 core course (3 units) from the Geophysics group
  - Planetary Physics: PTYS 505A; PTYS 505B; PTYS 517; PTYS 553
  - Planetary Chemistry: PTYS 510A; PTYS 510B
  - Planetary Geology/Geophysics: PTYS 512; PTYS 554

Exceptionally well prepared students may petition to waive the requirement to take a core course. Waiver requests are reviewed by the core course instructor in consultation with the GAAC. The student is required to demonstrate knowledge of the core course material. Waiving courses in this way does not change the number of questions that the student is required to answer in each section of the written comprehensive examination.

- **Nine** units of coursework in the minor field of study (or as required by minor department).
- **Twelve** units of elective coursework (graded ABCDE) numbered PTYS 500 or above
- **Twelve** additional units of elective courses numbered 500 or above (including research, field trips, independent study, PTYS elective courses, seminars, and courses offered in other departments) as approved by the major advisor.
- **Eighteen** units of dissertation credit (PTYS 920; PTYS 910 thesis units may not be substituted for 920).

At least one half the units used on the Doctoral Plan of Study must be in courses in which regular grades (ABC) have been earned.

Students must maintain a GPA of 3.0 or better in the PTYS core courses to be considered in good academic standing. Failure to maintain this standing must be corrected in the following semester. Failure to restore good academic standing in the following semester results in dismissal from the Ph.D. program.

## **Academic Standing and Academic Progress**

Ph.D. students are expected to satisfy [Graduate College rules on academic standing](#) and [academic progress](#) with respect to course work. In addition, good academic standing in the Department of Planetary Sciences doctoral program requires that the Dissertation Progress Report indicate satisfactory progress toward completing the dissertation. A student's failure to meet with their committee within the required time frame is equivalent to an unsatisfactory progress report. In the event that the Dissertation Committee determines that satisfactory progress is not being made, the student is deemed to be on [academic probation](#). In this case, a second Dissertation Progress Report must be delivered within 6 months of the unsatisfactory report. If this second report is satisfactory, the student is once again considered to be making academic progress. However, if the Dissertation Committee reports unsatisfactory progress after this second Dissertation Progress Report, the student's participation in the doctoral program is terminated and the student reverts to non-degree status in the Graduate College. In this case, the student retains the option of applying to the department's M.S. program and completing a M.S. degree.

In the event of an unsatisfactory progress report, the Dissertation Committee chairman will deliver a letter to the student explaining the reason for the unsatisfactory report within 2 weeks of the Dissertation Progress meeting. The letter must also indicate how the student can return to satisfactory standing and the date by which these actions must occur. Copies of this letter must be filed with the Graduate College, the chairman of the GAAC, the department head and assistant department head. The student may appeal the Dissertation Committee's decision to the GAAC after receiving this letter, and the case will be reviewed by the GAAC.

## **Teaching Assistantships**

Students are required to serve as teaching assistants in a course offered by PTYS at a minimum one-quarter time level for a minimum of one semester. Students with teaching experience outside the PTYS department may petition the GAAC to waive this requirement.

## **Minor Requirements**

All PTYS Ph.D. students are required to complete a minor program of study. The minor course of study is chosen in consultation with the student's Minor Advisor. There are two options to fulfill the minor requirement: (1) students may minor in Planetary Sciences; or (2) students may minor in any physical science through another department or approved program at the University of Arizona. Students taking the Planetary Sciences minor must construct a sequence of courses, approved by the Minor Committee, which includes a combination of graduate courses in the physical sciences that support a coherent theme relevant to planetary science. Students electing an outside minor are responsible for determining and fulfilling the requirements for a minor in an outside department or approved program.

A master's degree in a relevant scientific discipline from another university may satisfy the minor requirement. In this case the student petitions the GAAC, which serves as the minor committee. Documentation of the relevance and extent of the student's master's work is required.

- The University of Arizona Graduate College requirements for Minor Program of Study are available at <http://catalog.arizona.edu/policy/graduate-minors>
- All minors, regardless of department, consist of at least nine units of 500 or higher level courses.
- The minor course of study must be approved by the student's Minor Committee.
- The student may be required to take a Minor Exam, depending on area of study, requirements of departments outside PTYS, or the Minor Committee.
- The student must maintain a GPA of 3.0 or better in their minor coursework to be considered in good academic standing.

## Graduate Student Colloquia

Students are required to present three Graduate Student Colloquia. The presentations are evaluated by the audience and the student will be informed of the results of those evaluations within one month of the presentation.

- The colloquia are given in the second, third, and fourth semesters of study.
- At least one colloquium must be a review of an article (not authored by the student) in a peer-reviewed journal.
- At least one colloquium must be a summary of the student's research.

## Comprehensive Examination for Advancement to Candidacy

The UA Graduate College Policies and Procedures for the Comprehensive Examination for Advancement to Candidacy are here:

<http://grad.arizona.edu/academics/program-requirements/doctor-of-philosophy/comprehensive-examination>.

Before admission to candidacy for the doctoral degree, the student must pass a written and an oral Comprehensive Examination. These examinations test the student's knowledge of the major and minor subjects of study, both in breadth across the general field of study and in depth within the area of specialization. The examination, therefore, should not take place until the student has completed all, or almost all, of their coursework. The Comprehensive Examination is considered a single examination, although it consists of written and oral parts.

**Written Examination.** A student will pass the written exam before sitting for the oral exam. The written exam will be offered at the end of each spring semester and possibly at other times at the discretion of the faculty.

The purpose of the written exam is to test a student's broad knowledge in planetary sciences. The structure of the exam will reflect the structure of the curriculum. The exam includes 3 sections consisting of questions in Planetary Physics, Chemistry, and Geology. Each section will have 2 questions from each of the core courses in that area; thus, there will be 8 Physics questions, 4 Chemistry questions, and 4 Geology/Geophysics questions—a total of 16 questions.

Students must answer 4 of the Physics questions and 2 each of the Chemistry and Geology/Geophysics questions. The choice of questions to answer is up to the student. They might choose questions related to the core courses they have taken, but they are free to choose other questions if they wish. The written exam will last 6 hours and will consist of two 3 hour sessions separated by a 1 to 2 hour break.

The exam will be administered by a Preliminary Examination Committee who will also be responsible for grading the exam and determining the final result (pass/fail). Passing grade is 60% across all sections. If a

student passes the exam, but scores <60% in any of the three subject areas, the student must take and pass graded course(s) in that subject area(s) within two years. Course(s) will be selected by the student in consultation with his/her advisor and with approval of the Written Exam Committee.

Candidates either pass the written exam, fail with the opportunity to retake the exam the next time it is offered, or fail without the opportunity to retake the exam. This will be decided by the Preliminary Examination Committee. No more than one retake of the written exam is permitted.

Students may elect to take the written exam at any time that it is offered. It is not necessary to wait until the end of the second year of graduate school.

The Department may offer the written exam more often than once a year, on an ad hoc basis, i.e., if there is a significant number of students that would benefit from an exam offered in the fall.

**Oral Examination.** Upon successful completion of the written portion of the examination, the Oral Comprehensive Examination is conducted before the examining committee of the faculty. The oral portion of the examination must cover both the major and the minor subjects. All committee members must participate throughout the entire exam. Should special circumstances require a committee member to attend remotely, prior permission from the Graduate College, the Director of the Graduate Program, and the committee chair is necessary. Graduate College requirements for the oral examination are here:

<http://grad.arizona.edu/academics/program-requirements/doctor-of-philosophy/comprehensive-examination>

Remote participation of committee members should be avoided. It is best to avoid taking the oral exam during the summer. The departmental representative on the committee (the so-called “standing member”) and the chair must be physically present at the exam. The candidate should notify the Graduate Admissions and Advising Committee (GAAC) as soon as possible if they anticipate difficulty in scheduling the exam. The GAAC will work with the student and committee chair to find suitable replacement committee members, if necessary.

The Oral Exam in Planetary Sciences will concentrate on the student’s research accomplishments and potential. The Oral Examination will begin with a student presentation that will last a **maximum of 15 minutes**. The student will prepare two short proposals on research topics, as described in the document titled [Ph.D. Procedures](#).

The Oral Comprehensive Examination may not be less than two hours or longer than three hours.

Failing the examination requires a negative vote of two or more committee members. An abstention counts as a negative vote.

Candidates must attempt the Oral Comprehensive Examination **before the end of their sixth semester since initial enrollment**. The student must have completed all PTYS core courses and the minor requirements before taking the oral examination.

Candidates either pass the oral exam, fail with the opportunity to retake the exam not sooner than 6 weeks after the failed exam and not longer than 12 months afterward, or fail without the opportunity to retake the exam. In this last case the student is dismissed from the Ph.D. program. However, the student remains eligible for the M.S. degree program.

## Dissertation

The University of Arizona Graduate College requirements for the dissertation are available online at <http://grad.arizona.edu/academics/program-requirements/doctor-of-philosophy/dissertation>.

Students must write a Ph.D. dissertation describing the significant results of their research. The results must be original and of high enough quality to merit publication in the peer-reviewed literature.

Reprints of published papers or preprints of manuscripts submitted for publication may be included as chapters in theses or dissertations if the student is the first or sole author and if the student's committee consents. Because the thesis or dissertation must represent an integrated body of original scholarly work, the relevance of the work to the thesis must be explained in the Introduction or elsewhere within the thesis. Reprints or preprints of papers on which the student is an author, but not the first author, may only be included as appendices, although the work that the student contributed may be included within the body of the thesis or dissertation. Written permission must be obtained for the use of any copyrighted material.

The dissertation must conform to the rules described [online by the Graduate College](#). **One** copy of the dissertation must be deposited with the PTYS library.

## Final Oral Defense Examination

The Final Oral Defense Examination consists of two parts: (1) a public presentation during which the candidate describes the results of their research and satisfactorily addresses questions from the audience and (2) a closed examination, where the members of the Ph.D. Committee question the student to determine whether the dissertation meets the faculty's standards for independent intellectual and scholarly achievement. The entire proceedings may not exceed three hours. All members must be present. Should special circumstances require a member to attend remotely, prior permission from the Graduate College and the Department Head is necessary. Members of the committee must be present for the entire examination. The University of Arizona Graduate College requirements for the Final Oral Defense Examination are available online at <http://grad.arizona.edu/academics/program-requirements/doctor-of-philosophy/final-oral-defense-examination>.

All other requirements of the Ph.D. program must be completed prior to the Final Oral Defense.

Candidates must pass the Final Oral Defense Examination within 5 years of passing the Oral Comprehensive Examination.

The Ph.D. Committee may accept the dissertation as is, accept the dissertation subject to modifications, or reject the dissertation. In the latter case, the student is dismissed from the Ph.D. program.

Acceptance or rejection of the dissertation is decided by vote of the committee. In accordance with the [University of Arizona Graduate College requirements](#), if there is more than one dissenting vote then the dissertation is rejected.