

Doctor of Philosophy

A. Credits and Academic Requirements

The doctor of philosophy degree requires completion of a minimum of 72 credits beyond the bachelor's degree. At least 24 credits must be research credits earned under the supervision of a Mines faculty advisor and at least 18 credits of coursework must be applied to the degree program. For more information about specific requirements, please refer to the appropriate department/program section of this catalog.

The degree also requires completion of a satisfactory doctoral thesis and successful oral defense of this thesis. The doctoral thesis is expected to report on original research that results in a significant contribution of new knowledge and/or techniques. The student's faculty advisor and the doctoral thesis committee must approve the program of study and the topic for the thesis.

B. Residency Requirements

Doctoral students must complete a residency requirement during the course of their graduate studies. The purpose of this requirement is as follows:

- require students to become engaged in extended and focused research activities under the direct supervision of Mines faculty.
- allow students to become immersed in the culture of an academic environment.
- allow students to engage in the professional activities associated with their research discipline.
- ensure students have access to the research tools and expertise needed for their chosen research activity.
- ensure the conduct of cutting-edge research with the expectation that this research will be completed in a timely fashion so that it is still relevant to the larger research community.
- provide Mines faculty with the ability to directly evaluate the research and academic credentials of a student and as such protect the integrity of the degree, the department/program, and the institution.
- ensure the research produced by students claiming a Mines degree is actually the product of Mines' intellectual environment.
- make it clear that the intellectual property developed while in the degree program is the property of Mines as defined in the Faculty Handbook.

The residency requirement may be met by completing two semesters of full-time registration at Mines. The semesters need not be consecutive. Students may request an exception to the full-time registration requirement from the graduate dean. Requests for exception must be in writing, must clearly address how the student's learning experience has met the goals of the residency requirement, as articulated above, and must be submitted by both the student and the student's thesis advisor and be approved by the student's department head/program director.

Students in online doctoral programs are exempt from this residency requirement.

C. Transfer of Credits

Up to 24 credits of graduate-level coursework may be transferred from other institutions toward the PhD degree subject to the restriction that those courses must not have been used as credit toward a bachelor's degree, must not be prerequisites or deficiencies, must have a letter

grade of C or better, and must be graduate-level credits. Requests for transfer credit must be approved by the faculty according to a process defined by the student's home department or program. Transfer credits are not included in calculating the student's grade-point average at Mines.

In lieu of transfer credit for individual courses defined above, students who enter the PhD program with a thesis-based master's degree from another institution may transfer up to 36 credits in recognition of the coursework and research completed for that degree. The request must be approved by the faculty according to a process defined by the student's home department or program.

D. Faculty Advisor Appointments

When admitted, each doctoral student is assigned a graduate faculty advisor by the department or program. Students who are assigned temporary advisors at admissions will work with their department or program to have a permanent advisor assigned. PhD students changing a temporary advisor to a permanent advisor or selecting a new advisor will need the new faculty advisor approved by the Office of Graduate Studies by the end of the second semester at Mines.

Advisors will advise students with respect to the student's thesis direction, research, and selection of courses. Advisors must be designated as a Mines graduate faculty member. Please refer to the Faculty Handbook for a definition of what constitutes Mines graduate faculty. Upon approval by the graduate dean, adjunct faculty, teaching faculty, visiting professors, emeritus professors, and off-campus representatives may be designated additional co-advisors.

The department head or program director of the degree program, and the graduate dean, must approve all faculty advisor appointments.

E. Minor Programs

Students may choose a minor program or programs at the PhD level consisting of 12 course credits in the minor program. The student's faculty advisor and doctoral thesis committee, including an appropriate minor committee member as described below, approve the course selection and sequence in the selected minor program. Students may choose to complete multiple minor programs. Each program must consist of at least 12 credits approved by the faculty advisor and doctoral thesis committee, including the appropriate minor committee members. Less than half of the credits applied toward the minor degree program may be in the form of transfer credits. Transfer credits applied toward a minor are included as part of the overall transfer limitation applied to the degree as defined above.

F. Doctoral Thesis Committees

The appointment status of faculty who can serve as voting members of a doctoral thesis committee was pending final approval by the Board of Trustees as of the date of publication of this catalog. Check with the Office of Graduate Studies for an update to the membership information provided below and if a catalog addendum is available.

The graduate dean will approve a doctoral thesis committee whose members have been recommended by the student, the student's faculty advisor, the student's department head and whose members meet the minimum requirements listed below. Students should have a thesis committee approved by the end of their second year of study. This committee must have a minimum of four voting members that fulfill the following criteria:

1. The committee must include an advisor who must be classified as a full member of the graduate faculty and must meet the qualifications defined above. If two advisors are appointed, advisor and co-advisor, both shall be voting members of the committee.
2. The committee must have at least two voting members knowledgeable in the technical areas of the thesis in addition to the advisor(s) and who are designated as either a full or associate member of the graduate faculty.
3. The fourth required member of the committee must be a full member of the graduate faculty. However, this fourth member may not be an advisor, co-advisor, or minor representative, and must be from outside the advisor's primary department and the program of the minor representative. This committee member acts as thesis committee chairperson.
4. If a thesis co-advisor is assigned, this individual, whether a member of the graduate faculty (associate or full) or an off-campus member, becomes a fifth required member of the committee. Co-advisors must be voting members of the committee.
5. If a minor field is designated, an additional committee member must be included who is an expert in that field. Minor representatives must be full members of the graduate faculty who are participating faculty in the minor program area. If multiple minor programs are pursued, each must have a committee representative as defined above.
6. Additional members from Mines or off-campus may serve, either with full voting status or in a non-voting capacity. Mines members with voting status must meet the same criteria as those of required committee members. If off-campus members are nominated for voting status, the committee request form must include a brief resume of their education and/or experience that demonstrates their competence to judge the quality and validity of the thesis. Such members also must agree to assume the same responsibilities expected of on-campus committee members including, but not limited to, attendance at committee meetings, review of thesis proposals and drafts, and participation in oral examinations and defense.

Shortly after its appointment, the doctoral thesis committee meets with the student to hear a presentation of the proposed course of study and thesis topic. The committee and student must agree on a satisfactory program. The student's faculty advisor then assumes the primary responsibility for monitoring the program, directing the thesis work, arranging qualifying examinations, and scheduling the thesis defense.

Upon completion of all prerequisite and core curriculum course requirements of their program, students must submit a Degree Audit form documenting satisfactory completion of the core curriculum requirements. Deficiency and/or prerequisite courses may not be listed on the Degree Audit form. The form must have the written approval of all members of the advisor and thesis committee, if appropriate.

G. Admission to Candidacy

Full-time students must complete the following requirements within the first two calendar years after enrolling into the PhD program:

- have an approved thesis committee form on file.
- complete all prerequisite and core curriculum course requirements of their program.
- demonstrate adequate preparation for and satisfactory ability to conduct doctoral research.
- be admitted into full candidacy for the degree.

If students are admitted with deficiencies, the appropriate department heads or program directors will provide the students written lists of courses required to remove the deficiencies. These lists will be given to the students no later than one week after the start of classes of their first semester in order to allow them to add/drop courses as necessary. Completion of prerequisites and deficiencies will be monitored by the department.

Each program also defines the process for determining whether its students have demonstrated adequate preparation for, and have satisfactory ability to do, high-quality, independent doctoral research in their specialties. These requirements and processes are described under the appropriate program headings in the section of this catalog on Graduate Degree Programs and Description of Courses.

To graduate, all PhD students must submit all required paperwork, apply to graduate, complete the graduation checkout course, complete the Survey of Earned Doctorate, and submit the signed Thesis Defense form by the posted deadlines. In addition, PhD students must upload a content-approved thesis and have the formatting approved by the posted checkout deadlines.

H. Thesis Defense

The doctoral thesis must be based on original research of excellent quality in a suitable technical field, and it must exhibit satisfactory literary merit. In addition, the format of the thesis must comply with Mines policy according to the guidelines upheld by the Office of Graduate Studies. (Formatting requirements are listed on the Office of Graduate Studies webpage and students should thoroughly read these guidelines before beginning work on the thesis.)

The thesis topic must be submitted in the form of a written proposal to the student's faculty advisor and the committee. The committee must approve the proposal at least one year before the thesis defense.

The student's faculty advisor is responsible for supervising the student's research work and consulting with other doctoral thesis committee members on the progress of the work. The advisor must consult with the committee on any significant change in the nature of the work. The student will submit an initial draft of their thesis to the advisor, who will work with the student on necessary revisions. Upon approval of the student's advisor, the revised thesis is distributed to the other members of the committee at least one week prior to the oral defense of the thesis.

The student must pass an oral defense of their thesis during the final semester of studies. Students must be registered to defend. This oral defense may include an examination of material covered in the student's coursework. The defense will be open to the public.

Following the defense, the doctoral thesis committee will meet privately to vote on whether the student has successfully defended the thesis. Three outcomes are possible: the student may pass the oral defense; the student may fail the defense; or the committee may vote to adjourn the defense to allow the student more time to address and remove weaknesses or inadequacies in the thesis or underlying research. Two negative votes will constitute a failure regardless of the number of committee members present at the thesis defense. In the event of either failure or adjournment, the chair of the doctoral thesis committee will prepare a written statement indicating the reasons for this action and will distribute copies to the student, the thesis committee members, the student's department head, and the graduate dean. In the case of failure, the student may request a re-examination, which must be scheduled no sooner than one week after the original defense. A second failure

to defend the thesis satisfactorily will result in the termination of the student's graduate program.

Upon passing the oral defense of thesis, the student must make any corrections in the thesis required by the doctoral thesis committee. The final, corrected copy and an executed signature page indicating approval by the student's advisor and department head must be submitted to the Office of Graduate Studies for review of the thesis format. (Instructions on Mines thesis format policy are available on the Office of Graduate Studies webpage and should be thoroughly read before beginning work on the thesis.) Any necessary revisions to the format of the thesis must be completed by the student and approved by the Office of Graduate Studies prior to the posted deadlines for completion of the student's graduate degree.

I. Time Limitations

A candidate for a thesis-based doctoral degree must complete all requirements for the degree within nine years of the date of admission into the degree program. Time spent on approved leaves of absence is included in the nine-year time limit. Candidates not meeting the time limitation will be notified and withdrawn from their degree programs.

Candidates may apply for a one-time extension of this time limitation. This application must be made in writing and approved by the candidate's advisor, thesis committee, department head or program director, and the graduate dean. The application must include specific timelines and milestones for degree completion. If an extension is approved, failure to meet any timeline or milestone will trigger immediate withdrawal from the degree program.

If the graduate dean denies an extension request, the candidate may appeal this decision to the provost. The appeal must be made in writing, must specifically state how the candidate believes the request submitted to the dean met the requirements of the policy, and must be received no later than 10 business days from the date of notification of the dean's denial of the original request. The provost's decision is final.

If a candidate is withdrawn from a degree program through this process (either by denial of an extension request or failure to meet a timeline or milestone) and wishes to re-enter the degree program, that candidate must formally reapply for readmission. The program has full authority to determine if readmission is to be granted, and if granted, to fully re-evaluate the candidate's work to date and determine its applicability to the new degree program.