DOCTORATE DEGREES

Doctor of Philosophy (Ph.D.) Degree

The degree of doctor of philosophy is awarded to students who have pursued graduate study without serious interruption, submitted an acceptable dissertation, passed all prescribed examinations, and satisfactorily met all requirements described below. The Missouri S&T graduate faculty attests that recipients of this degree have attained a high level of learning through extensive study in some specialized area of knowledge, and have developed the ability to conduct independent research. Students interested in pursuing the Ph.D. at Missouri S&T must first submit a complete application package. Please consult your prospective department’s website or entry in the areas of study sections of this catalog for further information about admissions requirements for particular programs.

Shared Doctoral Programs

Through its identification of faculty qualified to direct doctoral candidates on all four University of Missouri campuses, Missouri S&T provides a unique opportunity for doctoral students to attain a remarkable breadth of academic experience. Candidates admitted to doctoral status at Missouri S&T may plan, with the consent of their committee, either coursework or research on another University of Missouri campus. Advisory committee membership may also involve more than one campus, and dissertations may be pursued under the direction of an appropriate graduate faculty member on a campus other than Missouri S&T. Residency and other routine requirements of Missouri S&T must be followed. The dean of graduate studies should be involved in planning shared doctoral programs as early as possible, to prevent potential misunderstandings or complications.

Acceptance of Candidates for the Ph.D.

Technically, a student is considered a doctoral-level student only after he or she satisfactorily completes thirty credit hours of graduate study. Students must pass a Ph.D. qualifying examination before they can be formally considered candidates for the doctoral degree, and several departments require the qualifying examination to be passed by the end of the second semester after completion of the M.S. degree. All students wishing to pursue a doctoral degree must pass the qualifying examination no later than the fifth semester of enrollment as a graduate student in the doctoral program. The proposed Ph.D. program of study (Form 5, available at http://grad.mst.edu/currentstudents/forms/) must be submitted by the end of the semester in which the student passes his or her qualifying examination, but no later than six weeks into the fifth semester of enrollment. This examination may be taken after the student has been accepted to Missouri S&T, but prior to the student’s initial enrollment, if the student desires. The department chair will report the results of the qualifying examination to the office of graduate studies using Form 4 (http://grad.mst.edu/currentstudents/forms/).

A student will be formally accepted as a candidate for a doctoral degree after (1) he or she passes the qualifying exam and (2) his or her program of study, Form 5, has been approved by the advisory committee, the department chair, and the dean of graduate studies.

After passing the qualifying exam, the doctoral candidate will consult with an advisor of his or her choice to select an advisory committee. The committee will consist of at least five members, and the chair of the committee and at least three other members should belong to the graduate faculty. The advisory committee must include at least one member from outside the candidate’s major department. One member of the committee should also be designated to represent the department most closely associated with any minor field of study elected by the student. The names of the proposed members of the advisory committee will be listed on Form 5 (http://grad.mst.edu/currentstudents/forms/) and sent by the student’s department chair to the office of graduate studies for formal appointment. Additional members and replacement members may be appointed using Form 5-A.

Doctoral candidates are encouraged to make effective use of their advisory committee by:

- submitting a written description of the proposed research to the members of the committee as soon as the dissertation topic is decided
- obtaining written approval of the committee indicating that the proposed research is of Ph.D. caliber
- submitting periodic progress reports to the committee and discussing them with individual committee members or with the committee as a group (the frequency of the reports and the method of discussion should be determined by the committee)

A person who has held the rank of assistant professor or higher at Missouri S&T is not eligible to become a candidate for the Ph.D. at this institution.

Proposed Program of Study for the Ph.D.

Any student admitted to a doctoral program who has not already received a master’s degree should consult with his or her advisor about a proposed program of study. An advisory committee (listed on Form 5, available at http://grad.mst.edu/currentstudents/forms/), shall be submitted for approval by the dean of graduate studies no later than the fifth semester of enrollment as a graduate student in the doctoral program. The committee will aid the student in preparing an outline of his or her coursework and the research investigation proposed for the dissertation; this information will be included on Form 5 and must be submitted by the end of the semester in which the student passes his or her qualifying examination, but no later than six weeks into the fifth semester of enrollment as a graduate student in the doctoral program.

A doctoral student who has already received a master’s degree should also consult with his or her advisor about a proposed program of study, and complete and submit Form 5 to the office of graduate studies for approval before the student enrolls for a second semester. For Ph.D. students who have already earned a master’s degree, Form 5 will designate all appropriate graduate work beyond the baccalaureate level to be applied to the doctoral program requirements. Courses listed on a doctoral program of study (Form 5) cannot be listed or have been listed on a program of study (Form 1) for a second, or subsequent master’s degree.

Residency Requirement for the Ph.D.

Residency at Missouri S&T is defined as sustained intellectual interactions among the student and the academic community. The candidate for a Ph.D. degree will normally complete three years of residency, which is the equivalent of completing six academic semesters while enrolled as an on-campus student at Missouri S&T. Students holding a master’s degree are automatically credited with two semesters of residency.
Students unable to meet the residency requirement given above, such as distance students, can meet this requirement through an alternative route. In consultation with their advisor, the student can utilize other experiences towards meeting the residency requirements. Such experiences include regular contact with the student’s advisor, committee members, and other graduate students, participation in a seminar series, etc. Other experiences that would count toward earning residency are listed in a supplemental document available from the office of the dean of graduate studies. It is the responsibility of the student’s faculty advisor to document suitable residency experiences each semester.

Ph.D. Qualifying Examination

A qualifying examination will be administered by the faculty of the candidate’s major department no later than the fifth semester of enrollment as a graduate student in the doctoral program. The results of this examination will allow the student’s advisory committee to assess the student’s level of preparation for the Ph.D. degree, and will assist the committee in helping to plan the student’s program of study (Form 5). The results of the qualifying examination will be reported on Form 4 and submitted by the department chair to the office of graduate studies.

Subjects of Study for the Ph.D.

The subjects of study for the Ph.D. may be chosen from one or more departments, as determined by the advisory committee, but shall constitute a definite plan of training for research or scholarly investigation in some particular field. Students must designate a major field of study, and are encouraged to select one minor field of study consisting of at least twelve credit hours of work outside their major area of study.

The doctoral program will include at least 24 credit hours of graduate research and a minimum of 24 credit hours of coursework (exclusive of 5000, 5002, 5099, 6000, 6002-graduate research) as part of the degree requirements. Deviations from this requirement must receive special approval from the dean of graduate studies. Students are encouraged to enroll in at least fifteen credit hours of 6000-level lecture courses during the span of their doctoral program.

Correspondence and extension courses do not form part of the program for the Ph.D. degree, except as they constitute a part of a master’s program. Correspondence and extension courses beyond those allowed for a master’s degree may not be applied to a doctoral degree program. Graduate faculty recognize that distance sections of Missouri S&T approved courses number may be applied to the doctoral degree program.

Doctoral research will normally be conducted on the Missouri S&T campus. In special cases, all or part of the research may be conducted elsewhere, but must be supervised by a member of the Missouri S&T faculty. Students who conduct off-campus research must have the prior written approval of their advisor, the department chair, and the dean of graduate studies, as indicated on the non-resident research application (http://grad.mst.edu/currentstudents/forms/).

Transferring Credits for a Ph.D. Degree

Course work taken from another university may be transferred to the Ph.D. program. A student who has not earned a master’s degree may transfer a maximum of 18 credit hours; students with a master’s degree may transfer a maximum of nine credit hours. Such credits must have been registered as graduate courses when they were taken. Students must have earned at least a B grade for all courses to be transferred to a Missouri S&T graduate program, and these transferred courses must be entered as part of the students program on Form 5 or 5A. The Missouri S&T equivalent should be stated and a transcript that includes the course(s) to be transferred should accompany Form 5. Approval of Form 5 or Form 5A will allow the transferred course(s) to be entered on the students Missouri S&T transcript, but only after the registrar's office has received the students' official transcript(s) from his or her previous school(s).

Time Limits for Earning the Ph.D.

The Ph.D. degree will be granted only if all graduate credit counted toward the degree has been earned in the previous eight years, unless a formal request for an extension is initiated by the advisor and approved by the department chair and the dean of graduate studies. An extension, if granted, may involve revising the candidate’s program of study to update coursework and research. Students who are enrolled in a documented Ph.D. distance program, such as the one available in systems engineering, must also complete their graduation requirements within eight years. Candidates who have already earned a master’s degree or its equivalent (first thirty hours of graduate credit), or who passed the qualifying examination, must have earned all remaining credit toward their degree within the last six years.

Applying prior credits from a master's degree program or its equivalent toward a doctoral degree program is up to the discretion of the student’s advisory committee.

Foreign Language Requirements for the Ph.D.

The decision as to any foreign language requirement rests with the department and the doctoral candidate’s advisory committee, and descriptions of any foreign language requirement can be found on the departmental websites or in the Areas of Study section of this catalog. Candidates may fulfill their foreign language requirement, if any, either before or after they take their comprehensive examination.

Ph.D. Comprehensive Examination

The office of graduate studies will authorize the student’s advisory committee to administer a comprehensive examination after the student has completed at least 50% of the coursework required for a doctoral degree, as listed on the student’s approved program of study (Forms 5 and 5-A). Some departments require students to complete 100% of their coursework before they are permitted to take the comprehensive examination; consult your department’s website or entry in the areas of study sections of this catalog for additional details. The format of the comprehensive examination may be either written or oral, or both.

With the approval of the student’s advisory committee, the examination may be administered by the candidate’s department, but the final judgment of the candidate’s performance will be left to the advisory committee.

The results of the comprehensive examination will be sent to the dean of graduate studies, using Form 6B (http://grad.mst.edu/currentstudents/forms/). A student will be considered to have passed the examination if all, or all but one, of the advisory committee members vote that the student pass.

If the student fails the comprehensive examination, the advisory committee will recommend additional work or other remedial measures to the candidate. A second comprehensive examination may be scheduled no sooner than twelve weeks after the student’s first attempt. A student who fails the examination a second time will no longer be eligible to receive a graduate degree from that program. However, the
student is still eligible to pursue a graduate degree from any other graduate degree program willing to accept him or her.

Ph.D. Dissertation
The dissertation, embodying the results of an original investigation, must be written upon a subject approved by the student's major advisor and be formatted in accordance with “Specifications for Theses and Dissertations,” a manual available online at: http://grad.mst.edu/currentstudents/thesesdissertationinformation/formatting/. Effective June 1, 2013, the final copy of the dissertation must be submitted electronically unless an indefinite hold is being placed on the dissertation.

Final Examination, or Ph.D. Dissertation Defense
The final examination is an oral defense of the dissertation and may be attended by any interested person. Attendees may question the candidate with the permission of the chair of the advisory committee. The dean of graduate studies will authorize the student’s advisory committee to administer the final examination, which may be scheduled no sooner than twelve weeks after the completion of the comprehensive examination. Notice of the final examination, along with the dissertation abstract, shall be publicized by the office of graduate studies at least one week prior to the examination.

The advisory committee shall closely examine the dissertation for both scientific content and format, in order to determine that it meets the requirements for a doctoral degree and is worthy of acceptance by the graduate faculty of Missouri S&T. A report of the examination results will be sent to the office of graduate studies using Form 7 (http://grad.mst.edu/currentstudents/forms/).

A candidate will be considered to have passed the final examination if all, or all but one, of the advisory committee members vote that the student pass. If the student fails the final examination, the committee will recommend additional work or other remedial measures to be taken before another examination is scheduled. At the close of a successful final examination, the members of the examining committee will sign the Form 7 to signify that they have read and approved the dissertation. If the committee indicates that corrections must be made, the student must make such corrections and then seek approval of the revised dissertation from the committee members and obtain the necessary signatures. The final approved copy of the dissertation is then taken to the office of graduate studies, where it is carefully checked to ensure that the document is properly formatted according to the specifications available online. After the office of graduate studies approves the document, it is submitted electronically (unless there is an indefinite hold) to the electronic thesis/dissertation (ETD) website. Upon departmental request, the student may present one copy of the approved dissertation to the department chair and one to the dissertation advisor, and may choose to make such corrections and then seek approval of the revised dissertation.

Procedures for Earning the Ph.D.
All doctoral students must have fulfilled all admissions requirements, including English proficiency test scores, if necessary. Students admitted to a Ph.D. program must adhere to the following procedures.

1. The student initiates his or her candidacy for the doctoral degree by meeting both of the following requirements
   A. The student passes a qualifying examination administered by the department in which the student intends to become a doctoral degree candidate.
   B. The student satisfactorily completes the first thirty hours of graduate study in his or her designated program. In the case of students who do not have a relevant master's degree, requirement b) will normally be fulfilled when the student satisfactorily completes thirty credit hours of suitable graduate coursework toward his or her doctoral degree. Requirement (b) will normally be fulfilled automatically for students who have already earned a relevant master’s degree. In both cases, the department determines when the second requirement for candidacy is satisfied. Candidacy must be established prior to the beginning of the fifth semester (not counting summer sessions) of enrollment as a graduate student in a doctoral program. Graduate Forms 4 and 5 must be completed and submitted no later than six weeks into the student's fifth semester of enrollment.

2. The candidate consults with his or her academic advisor about possible members of the advisory committee. The advisor, with the approval of the department chair, submits Form 5 to the dean of graduate studies, requesting the formal appointment of the advisory committee.

3. The candidate solicits the aid of his or her committee members in preparing an outline of courses and research, and, with the help of his or her advisor, completes and submits Form 5 to the office of graduate studies.

4. The candidate completes 50% of the coursework outlined on the doctoral program of study (Form 5). At this point, the advisor requests the dean of graduate studies to authorize the advisory committee to administer the Ph.D. comprehensive examination, using the request for authorization of Ph.D. comprehensive examination form (Form 6A) (http://grad.mst.edu/currentstudents/forms/). (Some departments, including geological sciences and engineering, materials science and engineering, and mining and nuclear engineering, do not require this authorization.)

5. The candidate takes the Ph.D. comprehensive examination, and the advisory committee reports the results of the examination to the dean of graduate studies by completing and submitting Form 6B (http://grad.mst.edu/currentstudents/forms/). After the candidate passes the comprehensive examination, he or she must maintain continuous enrollment until the degree is completed or the candidacy is cancelled.

6. The candidate checks with the registrar to make application for graduation within four weeks of the beginning of his or her final semester, or within two weeks of the beginning of the summer session. The student must apply for graduation through their JoeSS account.

7. The candidate, in consultation with his or her advisor, selects the date, time, and place of the final examination and informs the office of graduate studies electronically, so that the examination can be publicized at least one week in advance. Note: The candidate must be enrolled at the time of his or her examination. An on-campus candidate for a graduate degree may enroll during the intersession for the final examination only (course 6040) for no hours of credit and pay the examination fee.

8. The candidate takes the Ph.D. final exam, and the advisory committee reports the results of the examination to the office of graduate studies by completing and submitting Form 7 (http://grad.mst.edu/currentstudents/forms/), accompanied by a committee approved copy of the dissertation for format check.

9. Once the format check is complete the office of graduate studies will direct the student to submit the final copy of the dissertation.
Residency Requirements for the D.E.

Residency at Missouri S&T is defined as sustained intellectual interactions among the student and the academic community. The candidate for a D.E. degree will normally complete three years of residency, which is equivalent to completing six academic semesters while enrolled as an on-campus student at Missouri S&T. Students holding a master’s degree are automatically credited with two semesters of residency.

Students unable to meet the residency requirement given above, such as distance students, can meet this requirement through an alternative route. In consultation with their advisor, the student can utilize other experiences towards meeting the residency requirements. Such experiences include regular contact with the student’s advisor, committee members, and other graduate students, participation in a seminar series, etc. Other experiences that would count towards earning residency are listed in a supplemental document available from the office of the dean of graduate studies. It is the responsibility of the student’s faculty advisor to document suitable residency experiences each semester.

Time Limits for Earning the D.E.

The doctor of engineering degree will be granted only if all graduate credit counted toward the degree has been earned in the previous eight years, unless a formal request for an extension is initiated by the advisor and approved by the department chair and the dean of graduate studies. An extension, if granted, may involve revising the candidate’s program of study to update coursework and research.

Qualifying Examination for the D.E.

A qualifying examination will be administered by the faculty of the candidate’s major department no later than the fifth semester of enrollment as a graduate student in the doctoral program. The results of this examination will allow the student’s advisory committee to assess the student’s level of preparation for the doctor of engineering degree, and will assist the committee in planning the student’s program of study (Form 5). The results of the qualifying examination will be reported on Form 4 (http://grad.mst.edu/currentstudents/forms/) and submitted by the department chair to the office of graduate studies.

Coursework for the D.E.

The coursework for D.E. students normally includes two areas of emphasis in engineering. A third technical area of emphasis should be selected from the physical sciences, computer science, mathematics, or another field of engineering. In addition, a non-technical group of courses, comprising nine to twelve credit hours, should also be included in the student’s program of study. These non-technical courses could be selected from such areas as foreign language, engineering management, or psychology. D.E. students are expected to take at least 65 hours of graduate coursework (not including graduate research credit), and most students average around 72 hours. The allocation of the credit hours between the three technical emphasis areas will be at the discretion of the student’s advisory committee; however, at least nine credit hours in each technical area must be included to provide students with the appropriate depth of study.

Correspondence and extension courses may not be applied to a Doctor of Engineering degree program, except as they may constitute part of a master’s program.

Internship for the D.E.

The internship for the doctor of engineering degree involves a minimum of one year of planned and approved high-level engineering experience. The candidate and the major advisor will plan the internship in cooperation with the interning organization (normally an industrial concern or government laboratory). The candidate then prepares a detailed proposal that describes the goals of the internship, the tasks to be accomplished, and the facilities at the intended site. This proposal must be approved by the candidate’s advisory committee, the major department chair, and the dean of graduate studies prior to the start of the internship. At the time the internships is approved, the candidate’s internship advisor (the supervisor at the interning organization) will be added to the advisory committee (using Form 5-A). The internship advisor is to be selected on the basis of his or her thorough education and experience, qualifications that suggest doctoral equivalency credentials. The organization must allow visits to the internship site by the candidate’s major advisor and/or advisory committee members. The interning organization must also agree that any results of the internship may be published by the candidate, although reasonable proprietary rights of the interning organization will be protected. Responsibility for arranging the internship, including site selection and financial compensation during the period of the internship, lies with the candidate.

Graduate credit earned from the internship that leads to the candidate’s preparation for his or her dissertation work will apply toward the total required credit hours. Approximately 18 to 25 hours of graduate research credit for this phase of the degree will be regarded as an appropriate...
portion of the ninety total credit hours required for the doctor of engineering degree.

Comprehensive Examination for the D.E.
The D.E. student is required to pass a comprehensive examination during his or her candidacy. The comprehensive examination is planned and administered by the student's advisory committee, and has both a written and an oral component. The comprehensive examination covers coursework contained in the candidate's plan of study.

A candidate is considered to have passed if all, or all but one, of the advisory committee vote that the student pass. If the student fails the comprehensive examination, the advisory committee will recommend additional work or other remedial measures to the candidate. A second comprehensive examination may be scheduled no sooner than twelve weeks after the student's first attempt. A student who fails the examination a second time will no longer be eligible to receive a graduate degree from that program. However, the student is still eligible to pursue a graduate degree from any other graduate degree program willing to accept him or her.

Dissertation for the D.E.
The dissertation embodies the results of an original engineering investigation, and must be written upon a subject approved by the major advisor. Normally, the dissertation will relate directly to the candidate's engineering internship. The dissertation must represent significant, creative, and independent engineering work, and must be prepared in accordance with the “Specifications for Theses and Dissertations,” an online manual available at http://grad.mst.edu/currentstudents/thesisdissertationinformation/formatting/.

Final Examination, or Doctoral Dissertation Defense
The final examination is an oral defense of the dissertation and may be attended by any interested person. Attendees may question the candidate with the permission of the chair of the advisory committee. The dean of graduate studies will authorize the student’s advisory committee to administer the final examination, which may be scheduled no sooner than twelve weeks after the completion of the comprehensive examination. Notice of the final examination, along with the dissertation abstract, shall be publicized by the office of graduate studies at least one week prior to the examination.

The advisory committee shall closely examine the dissertation for both scientific content and format, in order to determine that it meets the requirements for a doctoral degree and is worth of acceptance by the graduate faculty of Missouri S&T. A report of the examination results will be sent to the office of graduate studies using Form 7 (http://grad.mst.edu/currentstudents/forms/).

A candidate will be considered to have passed the final examination if all, or all but one, of the advisory committee members vote that the student pass. If the student fails the final examination, the committee will recommend additional work or other remedial measures to be taken before another examination is scheduled. At the close of a successful final examination, the members of the examining committee will sign the Form 7 to signify that they have read and approved the dissertation. If the committee indicates that corrections must be made, the student must make such corrections and then seek approval of the revised dissertation from the committee members and obtain the necessary signatures. The final approved copy of the dissertation is then taken to the office of graduate studies, where it is carefully checked to ensure that the document is properly formatted according to the specifications available online. After the office of graduate studies approves the document, it is submitted electronically (unless there is an indefinite hold) to the electronic thesis/dissertation (ETD) website. Upon departmental request, the candidate may present one copy of the approved dissertation to the department chair and one to the dissertation advisor, and may choose to retain one copy for his or her personal records.

Procedures for Earning the D.E.
All doctor of engineering students must have fulfilled all admissions requirements, including English proficiency test scores, if necessary. Students admitted to D.E. program must adhere to the following procedures.

1. The student takes and passes, as early in the program as possible, a qualifying examination administered by the faculty of his or her major department. The department chair reports the results of this qualifying examination to the dean of graduate studies using Form 4.
2. The D.E. candidate consults with his or her advisor to select an advisory committee of at least five members. This should be undertaken only after the candidate has completed thirty graduate credit hours or has already earned a relevant master's degree. However, a tentative program of study may be planned much earlier.
3. The D.E. candidate's graduate advisor, with the approval of the department chair, submits Form 5 to the dean of graduate studies, requesting the formal appointment of the advisory committee. Any changes in committee membership are to be recorded using Form 5-A.
4. The D.E. candidate solicits the aid of his or her committee members in preparing a plan of study and internship, using Form 5-DE. Form 5-DE should not be sent to the department chair or to the dean of graduate studies for approval until the student has passed the qualifying examination.
5. The D.E. candidate completes all the courses outlined on his or her program of study (Form 5-DE). At this point, the candidate’s advisor requests the dean of graduate studies to authorize the advisory committee to administer the comprehensive examination, using the Request for Authorization of Ph.D. Comprehensive examination form (Form 6A) (http://grad.mst.edu/currentstudents/forms/). Some departments, including geological sciences and engineering, materials science and engineering, and mining and nuclear engineering, do not require this authorization.
6. The D.E. candidate takes the comprehensive examination, and the advisory committee reports the results of the examination to the dean of graduate studies by completing and submitting Form 6B (http://grad.mst.edu/currentstudents/forms/). After passing the comprehensive examination, the candidate must maintain continuous enrollment until the degree is completed or the candidacy is cancelled.
7. The D.E. candidate completes his or her engineering internship. The candidate's industrial supervisor should be added to the advisory committee at the beginning of the internship (Form 5-A).
8. The D.E. candidate checks with the registrar to make application for graduation within four weeks of the beginning of the student’s final semester, or within two weeks of the beginning of the summer session. The student must apply for graduation through their Joe'SS account.
9. The D.E. candidate, in consultation with his or her advisor, selects the date, time, and place of the final examination and informs the office of graduate studies electronically, so that the examination can be publicized at least one week in advance. Note: The candidate
must be enrolled at the time of his or her examination. An on-campus candidate for a graduate degree may enroll during the intersession for the final examination only (course 6040) for no hours of credit and pay the examination fee.

10. The candidate takes the D.E. final exam, and the advisory committee reports the results of the examination to the office of graduate studies by completing and submitting Form 7, (http://grad.mst.edu/currentstudents/forms/), accompanied by a committee approved copy of the dissertation for format check.

11. Once the format check is complete the office of graduate studies will direct the student to submit the final copy of the dissertation electronically to the ETD website providing the candidate has fulfilled all academic requirements and has paid all enrollment or examination fees and submitted a certificate of completion of the “Survey of Earned Doctorates” (https://sed-ncses.org/) (if an indefinite hold placed on the dissertation the office of graduate studies will inform the student of submission requirements).

12. Upon departmental request, the candidate may present one copy of the approved dissertation to the department chair and one to the advisor, and may retain one copy for his or her personal records.

13. The Board of Curators, upon the recommendation of the graduate faculty, grants the candidate the doctor of engineering degree.