

ENGINEERING, PH.D.

The Ph.D. in engineering program at Saint Louis University's School of Science and Engineering focuses on a specific research topic. SLU students conduct original academic research culminating in a dissertation and peer-reviewed publications. Additional coursework related to the chosen research area is also required.

Doctor of Philosophy in Engineering students prepare a program of study that must be approved by the faculty advisor, department chair and the director of graduate programs. This program of study is developed and then reviewed within the context of students' backgrounds and career goals, allowing students to customize their program to suit their professional goals.

Graduate students in engineering at Saint Louis University will demonstrate:

1. Enhanced professional and analytical skills through the development of an in-depth understanding of theoretical and practical concepts;
2. Excellent communication skills through written and oral presentations;
3. Creative thinking skills through mastery of topics required to solve complex engineering problems; and
4. Depth of knowledge required to pursue advanced work in a modern, ever-changing world through entrepreneurial experiences woven into their program.

These attributes will be assessed during the required examination milestones. For a Ph.D., the required milestones include a qualifying exam, a written dissertation proposal and corresponding oral defense, and a written dissertation and corresponding oral defense presentation.

Curriculum Overview

The Ph.D. in engineering requires a total of 60 credits of coursework beyond the bachelor's degree, with 12 credits of dissertation. A limited number of courses may be at the 4000 level; all others must be at the 5000 or higher level. Students who earn an M.S. may include a maximum of 24 master's degree course credits with departmental approval, but not the thesis or project credits in the 60 credits for the Ph.D. degree.

There are three concentrations in the engineering doctorate:

- Aerospace and mechanical engineering
- Civil engineering
- Electrical and computer engineering

Fieldwork and Research Opportunities

School of Science and Engineering graduate students gain valuable experience working with both faculty and peers. Additional opportunities to publish in scientific journals and attend professional conferences prepare our graduates for careers in industry or academia.

Saint Louis University's location in a vibrant and industry-rich city means that faculty members have access to and relationships with industry professionals. The School of Science and Engineering provides many opportunities for these professionals to interact with students, share their real-world experiences, network and even collaborate on research projects. Therefore, students have access not only to top-notch faculty but to the most recent developments in industry.

The expert faculty of the School of Science and Engineering collaborate with graduate students in groundbreaking research in the following areas:

- Engineering education
- Fluid dynamics
- Haptic and human-machine interfaces
- Hydrodynamics and environmental fluid mechanics
- Infrastructure
- Innovation and entrepreneurship
- Manufacturing and materials
- Space systems
- Transportation
- Unmanned aerial systems and flight control systems
- Water quality and treatment

Careers

Graduates of the doctorate program seek employment in the industry, government or as university professors.

Admission Requirements

Begin your application for this program at www.slu.edu/apply (<https://www.slu.edu/apply.php>).

Most admitted students meet the following criteria:

- Undergraduate GPA of at least 3.00
- A four-year undergraduate degree in engineering or a related field of the desired graduate program
- GRE optional (quantitative score greater than 150)

Application Requirements

- Application form
- Transcript(s) from all colleges and universities attended
- Three letters of recommendation (preferably from recent instructors)
- Résumé or curriculum vitae
- Professional goal statement

Requirements for International Students

Along with the general admission requirements above, the following must be provided by prospective international students:

- Demonstration of English language proficiency (<https://catalog.slu.edu/academic-policies/office-admission/graduate/english-language-proficiency/>).
- Proof of financial support that must include:
 - A letter of financial support from the person(s) or sponsoring agency funding the time at Saint Louis University.
 - A letter from the sponsor's bank verifying that the funds are available and will be so for the duration of study at the University.
- Academic records, in English translation, for post-secondary studies outside the United States. These must include the courses taken and/or lectures attended, practical laboratory work, the maximum and minimum grades attainable, the grades earned or the results of all end-of-term examinations, and any honors or degrees received. WES and ECE transcripts are accepted.

Assistantship Application Deadline

Admitted students who want to be considered for an assistantship must submit a separate application for consideration by their area of concentration.

Review Process

Once all the materials are received and the online application is complete, the appropriate engineering program will review the materials. The associate dean of graduate education makes the final decision.

Admissions decisions are made based on the background and educational experience of students. Applications are reviewed when completed, and decisions are generally made within a few weeks.

Apply Now (<https://www.slu.edu/apply.php>)

Tuition

| Tuition | Cost Per Credit |
|------------------|-----------------|
| Graduate Tuition | \$1,370 |

Additional charges may apply. Other resources are listed below:

Net Price Calculator (<https://www.slu.edu/financial-aid/tuition-and-costs/calculator.php>)

Information on Tuition and Fees (<https://catalog.slu.edu/academic-policies/student-financial-services/tuition/>)

Miscellaneous Fees (<https://catalog.slu.edu/academic-policies/student-financial-services/fees/>)

Information on Summer Tuition (<https://catalog.slu.edu/academic-policies/student-financial-services/tuition-summer/>)

Financial Support

The School of Science and Engineering offers graduate fellowship awards and assistantships each year. Assistantships provide tuition, stipend and health insurance. There are also many opportunities for students to receive funding through external research grants that are managed by individual faculty.

For more information, visit the Office of Student Financial Services (<https://slu.edu/financial-aid/>).

Learning Outcomes

1. Graduates will be able to apply knowledge of advanced concepts and analytical skills within engineering that enhance or add to the scientific consensus.
2. Graduates will be able to communicate clearly and creatively a mastery of topics required to solve complex engineering problems through peer-reviewed research and oral presentations.
3. Graduates will be able to conduct independent research that addresses problems in broader contexts.

Requirements

The Ph.D. in Engineering requires a total of 60 credits beyond the bachelor's degree with 12-18 credits of dissertation research. Of the 60 credits, a maximum of six credits may be comprised of coursework at the 4000-level; all other course credits must be at the 5000 or 6000-level. Those students who earn a Master of Science may include up to 24 credits from the associated Master of Science, but not the thesis or

project credits, in the 60 credits which are needed for the Ph.D. Ph.D. students should also satisfy four semesters of graduate seminar beyond a bachelor's degree.

Non-Course Requirements

First Semester in Ph.D. Program

In the first semester, Ph.D. students will begin taking courses as indicated in the program of study. In parallel, students may also begin research in an identified research area under the guidance of a faculty advisor.

The faculty advisor and students will form a guidance committee of at least five members. The committee members should be persons who will likely provide expertise and guidance that will assist students in their research. At least two members, besides the faculty advisor, must be in student's home department. If the faculty advisor is in another department, then one guidance committee member in the home department will be designated as the guidance committee chair.

Annual Student Review

Active students are expected to check in with their faculty advisor regularly regarding coursework and research, and all students go through an annual review using a process determined by their area of concentration, which is then submitted to the Office of Graduate Education.

Qualifying Exam

A qualifying exam will be administered according to the expectations of the academic discipline. For example, in engineering, a qualifying exam may be administered relatively early in the doctoral studies.

The student's guidance committee will advise students on preparation for the qualifying exam. Ideally, the guidance committee will continue after the qualifying exam and through the dissertation research.

The qualifying exam is designed to determine if students are prepared to continue Ph.D. studies. Normally, it is a written exam, with the option for follow-up with an oral exam. The details of the exam are determined by the home department, but all portions of the qualifying exam should be completed in one day.

Qualifying examinations are arranged and administered by the home department. The result of the exam may be a pass, no-pass or conditional pass. The conditional pass will normally require that students correct specific weaknesses, with appropriate modifications to the plan of study.

Qualifying exam procedures can be accessed at the School of Science and Engineering website (<https://www.slu.edu/science-and-engineering/student-resources/graduate-resources/>).

Dissertation Proposal and Doctoral Oral Examination

Typically, after a year following the qualifying exam, students will present and defend a dissertation proposal, called a doctoral oral examination. This exam is based on their written proposal, and their oral defense of the proposal. Both components will be evaluated by the guidance committee.

Doctoral candidate status will be given to students after the successful passage of the doctoral oral examination of the dissertation proposal.

Dissertation Defense

At a time selected by students and the guidance committee, the doctoral candidates present the dissertation research in both written and oral format. The defense typically includes a seminar that is open to the

public. Following the open session, the student defending and his or her guidance committee continues the discussion in a closed session.

Based on the defense, the guidance committee may:

1. approve the dissertation,
2. conditionally approve, with specific instructions on revisions to the dissertation document, or
3. not approve the dissertation.

Continuation Standards

Students must maintain a cumulative grade point average (GPA) of 3.00 in all graduate/professional courses.

Roadmap

Roadmaps are recommended semester-by-semester plans of study for programs and assume full-time enrollment unless otherwise noted.

Courses and milestones designated as critical (marked with !) must be completed in the semester listed to ensure a timely graduation. Transfer credit may change the roadmap.

This roadmap should not be used in the place of regular academic advising appointments. All students are encouraged to meet with their advisor/mentor each semester. Requirements, course availability and sequencing are subject to change.

| Course | Title | Credits |
|-------------------|----------------------------|----------|
| Year One | | |
| Fall | | |
| | Concentration Courses | 6 |
| | Credits | 6 |
| Spring | | |
| | Concentration Courses | 9 |
| | Credits | 9 |
| Year Two | | |
| Fall | | |
| | Concentration Courses | 9 |
| | Credits | 9 |
| Spring | | |
| | Concentration Courses | 9 |
| | PhD Qualifying Exam | 9 |
| Year Three | | |
| Fall | | |
| | Concentration Courses | 9 |
| | Credits | 9 |
| Spring | | |
| | Concentration Course | 3 |
| | Dissertation Research | 3 |
| | Credits | 6 |
| Year Four | | |
| Fall | | |
| | Concentration Course | 3 |
| | Dissertation Research | 3 |

Doctoral Oral Examination

| | Credits |
|---|-----------|
| Year Five | 6 |
| Fall | |
| Dissertation Research | 3 |
| Credits | 3 |
| Spring | |
| Dissertation Research | 3 |
| Final Defense of the Doctoral Dissertation | 3 |
| Credits | 3 |
| Total Credits | 60 |

Contact Us

For more information about any School of Science and Engineering graduate program, email ssegrad-admissions@slu.edu.