

Data Science, Analytics and Engineering, PhD

ESDSEPHD

Learn to meet the need for data-driven discovery of new knowledge and decision-making, which enhances enterprise performance as well as scientific investigation.

Program description

Degree awarded: PHD Data Science, Analytics and Engineering

The PhD program in data science, analytics and engineering engages students in fundamental and applied research.

The program's educational objective is to develop each student's ability to perform original research in the development and execution of data-driven methods for solving major societal problems. This includes the ability to identify research needs, adapt existing methods and create new methods as needed. This is accomplished through a rigorous education with research and educational experiences.

Students complete a foundational core covering database management, information assurance, statistical learning and statistical theory before choosing to focus on data analytics or data engineering. The program culminates in the production of a dissertation.

At a glance

- **College/School:** [Ira A. Fulton Schools of Engineering](#)
- **Location:** [Tempe](#)

Degree requirements

84 credit hours, a written comprehensive exam, an oral comprehensive exam, a prospectus and a dissertation

Required Core (12 credit hours)

CSE 511 Data Processing at Scale (3)

CSE 543 Information Assurance and Security (3)

CSE 572 Data Mining (3) or IEE 520 Statistical Learning for Data Mining (3) or EEE 549 Statistical Machine Learning: From Theory to Practice (3)

IEE 670 Mathematical Statistics (3) or STP 502 Theory of Statistics II: Inference (3) or EEE 554 Probability and Random Processes (3)

Electives and Additional Research (39 credit hours)

Research (12 credit hours)

DSE 792 Research (12)

Other Requirements (9 credit hours)

data engineering coursework or

data analytics coursework

Culminating Experience (12 credit hours)

DSE 799 Dissertation (12)

Additional Curriculum Information

All students must take qualifying exams covering the required core courses within one year of matriculation into the program.

The dissertation prospectus should be submitted and its oral defense completed no later than one year following completion of the 60th credit hour and also no later than the fourth year in the program.

Students must select coursework from either the data engineering or the data analytics requirements. Students should see the academic unit for the approved course list.

Students cannot take a data engineering or data analytics course and have it meet an elective requirement at the same time. Students need to take a different elective course to reach the number of credit hours required for the program. Other coursework may be used with the approval of the academic unit to fulfill these requirements.

Twelve credit hours of DSE 792 Research are required, and up to 24 credit hours are allowed on the plan of study. Students with research hours in excess of 12 will add these credit hours to their electives and additional research.

Electives include:

1. additional DSE 792 Research credit hours (up to 12 credit hours allowed beyond the required 12)
2. approved elective courses, of which up to three credit hours of DSE 790: Reading and Conference are permitted, with approval.

When approved by the student's supervisory committee and the Graduate College, this program allows 30 credit hours from a previously awarded master's degree to be used for this degree. If students do not have a previously awarded master's degree, the 30 hours of coursework are to be made up of electives to reach the required 84 credit hours.

Admission requirements

Applicants must fulfill the requirements of both the Graduate College and the Ira A. Fulton Schools of Engineering.

Applicants are eligible to apply to the program if they have earned a bachelor's or master's degree in engineering, computer science, mathematics, statistics or a related field from a regionally accredited institution.

Applicants must have a minimum cumulative GPA of 3.00 (scale is 4.00 = "A") in the last 60 hours of their first bachelor's degree program or a minimum cumulative GPA of 3.00 (scale is 4.00 = "A") in an applicable master's degree program.

Applicants are required to submit:

1. graduate admission application and application fee
2. official transcripts
3. two letters of recommendation
4. letter of intent or written statement
5. GRE scores
6. proof of English proficiency

Additional Application Information

An applicant whose native language is not English must provide proof of [English proficiency](#) regardless of their current residency.

ASU does not accept the GRE® General Test at home edition.

If the student is assigned any deficiency coursework upon admission, those classes must be completed with a grade of "B" (scale is 4.00 = "A") or higher within two semesters of admission to the program. Deficiency courses do not apply to the total credit hours required to complete the degree program.

Deficiency courses are:

CSE 205 Object-oriented Programming and Data Structures

IEE 380 Probability and Statistics for Engineering Problem Solving

MAT 242 Elementary Linear Algebra or MAT 342 Linear Algebra or MAT 343 Applied Linear Algebra

MAT 267 Calculus for Engineers III

Tuition information

When it comes to paying for higher education, everyone's situation is different. Students can learn about [ASU tuition and financial aid](#) options to find out which will work best for them.

Application deadlines

Fall

Spring [expand](#)

[expand](#)

Program learning outcomes

Program learning outcomes identify what a student will learn or be able to do upon completion of their program. This program has the following program outcomes:

- Apply the tools and methods from industrial statistics, operations research, machine learning, computer science and computer engineering on solving data analytic problems.
- Manage large, heterogeneous data sets for knowledge discovery.
- Conduct research resulting in an original contribution to knowledge in data sciences.

Career opportunities

Graduates demonstrate proficiency with existing methodology and significant accomplishment at advancing the state of the art in their chosen area, enabling them to pursue careers in the following fields:

- advanced research
- business
- government
- industry
- teaching

Contact information

[Computer Science and Engineering Program](#) | CTRPT 105

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