

Data Science, Analytics and Engineering (Computational Models and Data), MS

ESDSECMDMS

Learn data science skills based in an understanding of the algorithms and mathematical concepts in machine learning, deep learning through neural networks, and optimization --- all of which are needed to advance in the modern economy,

Program description

Degree awarded: MS Data Science, Analytics and Engineering (Computational Models and Data)

Data scientists are consistently ranked among the top jobs in the USA, and there is an increasing need for applied mathematicians to make use of data science tools like statistics, machine learning, artificial neural networks and artificial intelligence. Beyond the application of these tools, the fast-moving field of data science requires an understanding of the mathematical background of the algorithms behind these tools and the mathematical concepts that make these tools useful.

The MS program in data science, analytics and engineering with a concentration in computational models and data provides an advanced education in high-demand data science and computational mathematical modeling. A focus on computational skills in optimization, machine learning, stochastic processes and dynamical systems is enhanced by mathematical modeling in all application areas that use large scale data, including social sciences, astronomy, neuroscience, biosciences, engineering and epidemiology.

At a glance

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

Degree requirements

30 credit hours and a thesis, or

30 credit hours including the required capstone course (FSE 570)

Required Core (9 credit hours)

STP 502 Theory of Statistics II: Inference (3) or EEE 554 Probability and Random Processes (3) or DSE 501 Statistics for Data Analysts (3)

CSE 511 Data Processing at Scale (3) or CSE 512 Distributed Database Systems (3) or IFT 530 Advanced Database Management Systems (3)

Choose one:

CSE 572 Data Mining (3)

CSE 575 Statistical Machine Learning (3)

EEE 549 Statistical Machine Learning: From Theory to Practice (3)

IEE 520 Statistical Learning for Data Mining (3)

IFT 511 Analyzing Big Data (3)

IFT 512 Advanced Big Data Analytics/AI (3)

MAE 551 Applied Machine Learning for Mechanical Engineers (3)

STP 550 Statistical Machine Learning (3)

Concentration (9 credit hours)

APM 505 Applied Linear Algebra (3)

STP 530 Applied Regression Analysis (3)

Choose one:

APM 523 Optimization (3)

EEE 589 Convex Optimization (3)

IEE 620 Optimization I (3)

Electives (6 or 9 credit hours)

Culminating Experience (3 or 6 credit hours)

FSE 570 Data Science Capstone (3) or MAT 599 Thesis (6)

Additional Curriculum Information

Students should consult the academic unit for a list of approved electives and concentration course requirements.

Courses selected for the required core or concentration may not be used as elective coursework on the same plan of study. Students should check with their academic advisor to ensure that the total number of credit hours of their plan of study is equal to 30.

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 computing, engineering, mathematics, statistics, operations research, information technology 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. written statement
4. professional resume
5. two letters of recommendation
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. Applicants demonstrate proficiency in the English language by scoring at least 90 on the TOEFL iBT® (taken in a testing center), 7 on the IELTS or 115 on the Duolingo English test.

All applicants must demonstrate relevant coursework or experience in the following three areas:

- familiarity with Matlab, Python, SQL, R or other relevant programming skills (in the professional resume)
- undergraduate statistics or probability (e.g., IEE 380 Probability and Statistics for Engineering Problem Solving, STP 420 Introductory Applied Statistics, STP 421 Probability, EEE 350 Random Signal Analysis)
- undergraduate upper-division linear algebra (e.g., MAT 343 Applied Linear Algebra)

In addition, applicants without an undergraduate degree in computer science, computer engineering, software engineering, information technology, industrial engineering, operations research, statistics or a related computing field must show evidence (in the professional resume) of at least one of the following certifications or equivalent experience:

- AWS-certified cloud practitioner
- Google data analytics certificate
- Google IT support certificate

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](#)

Career opportunities

Applied mathematicians with a background in data science can pursue opportunities in a variety of fields to model, analyze and control dynamical processes that generate large data sets, including in the energy and power systems industry and pharmaceutical, semiconductor and communications industries.

Graduates may also work in government labs such as the Centers for Disease Control and Prevention, the National Institutes of Health, and the National Oceanic and Atmospheric Administration.

Contact information

[Electrical Engineering Program](#) | WXMLR A213

grad.math@asu.edu | 480-965-3951

[Admission deadlines](#)