

Data Science, Analytics and Engineering (Human-Centered Applications), MS

ESDSEHCAMS

Have you encountered accidental biases in smart devices or generative AI? Would you like to improve machine learning to best serve human needs? Learn the data science skills needed for the modern economy while enhancing your expertise at the intersection of human capabilities and data science.

Program description

Degree awarded: MS Data Science, Analytics and Engineering (Human Centered Applications)

There is an increasing need for all engineers to make use of data science tools like statistics, machine learning, artificial neural networks and artificial intelligence. Yet the majority of engineering occupations require subject matter expertise beyond data science.

The MS program in data science, analytics and engineering with a concentration in human-centered applications provides students with advanced education in high-demand data science with an understanding of human systems. A focus on probability and statistics, machine learning, data mining and data engineering is complemented by courses focusing on human capabilities and understanding human bias to ensure increased breadth and depth in data science applications. Students learn how to address problems, such as biases in machine learning due to select input data, determining useful human feedback for interactive machine learning, ethical issues in machine learning applications, and the use of artificial intelligence to support human weaknesses without hindering human strengths. In interdisciplinary courses, students can work with colleagues to solve client-driven data science problems that address human needs and capabilities.

At a glance

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

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), EEE 554 Probability and Random Processes (3) or DSE 501 Statistics for Data Analysts (3)

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

Choose one from the following:

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)

HSE 520 Methods and Tools in Applied Cognitive Science (3)

HSE 530 Intermediate Statistics for Human Systems Engineering (3)

HSE 531 Data Analytics: Modeling Human Subjects Data (3)

HSE 542 Foundations of Human Systems Engineering (3)

Electives (6 or 9 credit hours)

Culminating Experience (3 or 6 credit hours)

FSE 570 Data Science Capstone (3)

HSE 599 Thesis (6)

Additional Curriculum Information

For Concentration coursework, students select three courses for a total of nine credit hours.

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 their first bachelor's degree program or 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 nine semester hours of graduate coursework from a U.S. institution; or a cumulative GPA of 3.00 (scale is 4.00 = "A") in an applicable conferred master's degree program from a regionally accredited college or university.

Applicants are required to submit:

1. graduate admission application and application fee
2. official transcripts
3. written statement
4. professional resume
5. three 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 must 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:

- 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 linear algebra (e.g., MAT 242 Elementary Linear Algebra)
- familiarity with Matlab, Python, SQL, R, or other relevant programming skills (in the professional resume)

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 IT support certificate
- Google data analytics certificate

If the applicant does not meet the minimum GPA requirements, the application may still be considered. In certain cases, demonstrated aptitude through professional experience or additional postbaccalaureate education is considered.

Unofficial transcripts may be submitted at the time of application. If admitted, applicants must then submit official transcripts to ASU Graduate Admission Services.

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

Data scientists are consistently among the top jobs in the USA. Human-centered engineers with a background in data science can pursue opportunities in a variety of industries to manage and analyze data and extract knowledge from large data sets for decision-making, including in the following fields:

- clinical data managers
- computer and information research scientists
- human factors engineers and ergonomists
- statisticians

Contact information

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