

Complex Systems Science, MS

GFCMPXSSMS

Do you want to understand how to address complex challenges? Health, economic, urban and social challenges are often more complicated than people realize. Learn how to better grasp complexity and develop informed solutions that will lead to a better future.

Program description

Degree awarded: MS Complex Systems Science

Most systems are complex. This means that through the interaction between their parts, these systems exhibit emergent properties and unintended consequences.

The curriculum in the MS program in complex systems science focuses on developing skills in theoretical foundations, modeling, problem solving, critical thinking, and the importance of direct experience through research or related activities. Complex systems science students cultivate the ability to approach complex problems through analysis and modeling and by identifying issues, asking questions and collaborating with others to create effective solutions.

Graduates in complex systems science can apply their skills to a large number of areas and in many professions where they can make a difference through innovative and creative methods. Knowledge and skills gained in the program include:

- business enabler skills such as project management, decision-making, visualization and data communication
- digital building block skills such as artificial intelligence and data analytics, big data and data management, software development and information security
- domain knowledge in areas such as strategy, economics, marketing, communications and public relations, talent development and human resources, research and design, and product development
- human skills such as critical thinking, creativity, analytical reasoning, communication and collaboration

At a glance

- College/School: [College of Global Futures](#)
- Location: [Tempe](#) or [Online](#)

Degree requirements

30 credit hours including the required applied project course (CAS 593)

Required Core (15 credit hours)

CAS 501 Fundamentals of Complex Systems Science: Evolution (3)

CAS 502 Fundamentals of Complex Systems Science: Computation (3)

CAS 503 Fundamentals of Complex Systems Science: Collectives (3)

Choose two from the following:

CAS 520 Agent Based Modeling (3)

CAS 521 Methods for Complex Systems Science: Network Analysis (3)

CAS 522 Methods for Complex Systems Science: Dynamical Systems (3)

CAS 523 Methods for Complex Systems Science: Statistics and Dimensionality Reduction (3)

Electives (9 credit hours)

Culminating Experience (6 credit hours)

CAS 593 Applied Project (6)

Additional Curriculum Information

The applied project is a modeling and research project in any of the applied or foundational areas of complex systems science. Students define this project with a faculty mentor and apply a selection of methods covered in the methods courses to a dataset. The applied project also involves the creation of a portfolio of student accomplishments.

Admission requirements

Applicants must fulfill the requirements of both the Graduate College and the College of Global Futures.

Applicants are eligible to apply to the program if they have earned a bachelor's or master's degree in a STEM field, economics, social sciences, humanities 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.

All applicants must submit:

1. graduate admission application and application fee
2. official transcripts
3. two letters of recommendation
4. written statement
5. professional resume
6. proof of English proficiency

Additional Application Information

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

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.

Attend online

ASU Online

ASU offers this program in an online format with multiple enrollment sessions throughout the year. Applicants may [view the program's ASU Online page](#) for program descriptions and to request more information.

Application deadlines

Fall

Spring

[expand](#)

[expand](#)

Global opportunities

Global experience

Studying abroad is encouraged for graduate students. Nearly all of the College of Global Futures faculty-directed programs offer graduate credit. In addition, the Global Education Office offers more than 50 program opportunities, with programs on every continent.

Faculty-directed programs tend to be the best fit for graduate students; taking courses with ASU professors over the summer or during academic breaks offers students close mentorship and professional network growth in many fields of study while they earn ASU credit. Exchange program participation is also possible with careful planning.

Students can find programs specific to their interests on the [College of Global Futures Study Abroad](#) webpage, and additional opportunities and information on the [ASU Global Education Office](#) website. These sites also include additional information about applying for funding to support global travel.

Graduate students are also encouraged to apply for funding for international research, study and professional development through [ASU's Lorraine W. Frank Office of National Scholarships Advisement](#).

Career opportunities

Complex adaptive system concepts and methods serve as bridges between disciplines, providing a common language that enables the interdisciplinary collaborations necessary for coming to grips with today's intellectual and societal challenges.

A complex systems approach gives graduates the ability to understand the interconnections within and between technological, economic, societal, biomedical and environmental systems. It gives graduates advanced digital skills like modeling and network science. Graduates are fluent in the language of complexity and have a solid foundation in the domain knowledge of existing academic disciplines. This will give them an edge in diverse careers in science, technology and data analytics, especially compared with peers in their field of study who lack such expertise.

Career examples include:

- business intelligence analytics and data science
- consulting
- corporate social responsibility and sustainability
- data and microsystem engineering
- education
- environmental systems
- natural or health science management
- nongovernmental and nonprofit work
- policy making in government and regulatory agencies
- research and development

Contact information

[School of Complex Adaptive Systems](#) | ECA 100

CASSgrad@asu.edu | 480-727-0478

[Admission deadlines](#)