

Biological Design, MS

ESBDEMS

Learn to seamlessly traverse the spectrum between technology and biology to solve current and future challenges relating to energy, environment, human health, sustainability and security. You'll work on use-inspired projects and research with world-class faculty and peers.

Program description

Degree awarded: MS Biological Design

Students pursuing the MS degree in biological design are trained in the continuum between technology and biology by participating in a flexible training program that requires students to take one program core course (Principles of Biological Design), one course from a suite of biotechnology courses, and one from a suite of statistics courses.

The flexibility of this program, while maintaining key instructional structure, allows students from both traditional and nontraditional engineering backgrounds to have simultaneous access to training and mentoring in both engineering and technology with a biological focus. This gives students from diverse backgrounds access to transdisciplinary education and training that they would not have in traditional program settings.

As part of coursework and applied projects or theses, students read literature; identify critical problems related to energy, environment, human health, sustainability and security; and develop solutions to these problems using a synergy of technological and biological solutions, either in teams (course projects) or individually (thesis or applied project). Students are mentored by faculty from different colleges and schools at ASU.

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 applied project course (BDE 593)

Required Core (3 credit hours)

BDE 502 Research Methods in Biological Design (3)

Statistics (3 credit hours)

CHE 598 Topic: Six Sigma Methodology/Engineering Experimentation (3)

IEE 572 Design Engineering Experiments (3)

IEE 578 Regression Analysis (3)

IEE 670 Mathematical Statistics (3)

Biotechnology (3 credit hours)

BME 598 Topic: Bioenergy and Microbial Biotechnology (3)

BME 598 Topic: Cellular and System Modeling (3)

BME 598 Topic: Chimeras and Recombinant Organisms in Medicine (3)

CEE 565 Advanced Environmental Biotechnology (3)

CEE 567 Environmental Microbiology (3)

CEE 598 Topic: Bio-inspired Design (3)

CHE 579 Microbial Bioprocess Engineering (3)

CHE 598 Topic: Nanobiotechnology (3)

CHE 598 Topic: Synthetic Biology and Metabolic Engineering (3)

Electives (12 or 15 credit hours)

Other Requirements (3 credit hours)

BDE 591 Seminar (3)

Culminating Experience (3 or 6 credit hours)

BDE 593 Applied Project (3)

BDE 599 Thesis (6)

Additional Curriculum Information

BDE 591 Seminar is a one credit hour course to be taken in three semesters. This course may be substituted with the academic unit's approval.

Students select electives in consultation with their advisor. Students who complete the applied project for the culminating experience must complete 15 credit hours of electives, and students completing the thesis option take 12 credit hours of electives.

Students must complete three credit hours for each requirement in statistics and in biotechnology from the courses listed. If approved by the academic unit, courses may be substituted with an appropriate alternative.

Coursework selected as part of the statistics or biotechnology requirements 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 credit hours of their plan of study are 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 a related field, including physical sciences, biological sciences, and engineering, 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. three letters of recommendation
4. personal statement
5. 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 whose native language is not English are required to achieve a minimum score of 90 on the TOEFL iBT.

The application process is very competitive, and candidates are strongly encouraged to adhere to all priority deadlines.

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

Opportunities for graduates include placement in the broader biotechnology industry, including biopharmaceutical processing, biomanufacturing, sustainable biotechnology, and food and agribusiness industries. Some graduates pursue careers in entrepreneurship (e.g., startup companies), law (e.g., patent law), regulatory affairs and medicine.

Career examples include:

- clinical laboratory technologist
- environmental engineer
- environmental scientist and specialist
- epidemiologist
- health and safety engineer
- microbiologist

Contact information

[School for Engineering of Matter, Transport & Energy](#) | ECG 202
semtegrad@asu.edu | 480-965-2335