

Materials Science and Engineering, BSE

ESMSEBSE

Program description

Novel materials are tailored to meet the needs of targeted applications and become the foundation for all engineering disciplines. Such materials enable many new technologies and are commonly used in bioengineering and medicine, pharmaceuticals, electronics, optics, architecture and transportation, aviation and aerospace, energy conversion, environmental engineering and numerous industrial systems.

Materials science and engineering involves the discovery, synthesis, processing, manufacturing and characterization of substances within these general classes of materials: sustainable materials, polymers, metals, semiconductors, ceramics and composites. An understanding of the molecular structure and well-designed processing are the keys to engineering materials with outstanding properties for next-generation applications.

Courses in the undergraduate program in materials science and engineering prepare students to discover and design new and better materials that make an impact on and improve people's lives and keep America on the cutting edge of technology.


Accredited by the Engineering Accreditation Commission of ABET, <https://www.abet.org>, under the General Criteria and the Materials Engineering Program Criteria.

STEM-OPT for international students on F-1 visas

This program may be eligible for an Optional Practical Training extension for up to 24 months. This OPT work authorization period may help international students gain skills and experience in the U.S. Those interested in an OPT extension should [review ASU degrees that qualify for the STEM-OPT extension](#) at ASU's International Students and Scholars Center website.

The OPT extension only applies to students on an F-1 visa and does not apply to students completing a degree through ASU Online.

At a glance

- **College/school:** [Ira A. Fulton Schools of Engineering](#)
- **Location:** [Tempe](#)
- **Second language requirement:** No
- **STEM-OPT extension eligible:** Yes
- **First required math course:** MAT 265 - Calculus for Engineers I
- **Math intensity:** Substantial 

Curriculum

[View 2025 - 2026 curriculum](#)

[View curriculum archives](#)

Concurrent program options

Students pursuing concurrent degrees (also known as a “double major”) earn two distinct degrees and receive two diplomas. Working with their academic advisors, students can create their own concurrent degree combination. Some combinations are not possible due to high levels of overlap in curriculum.

Accelerated program options

This program allows students to obtain both a bachelor's and master's degree in as little as five years. It is offered as an [accelerated bachelor's plus master's degree](#) with:

[Materials Science and Engineering, MS](#)

Acceptance to the graduate program requires a separate application. Students typically receive approval to pursue the accelerated master's during the junior year of their bachelor's degree program. Interested students can learn about eligibility requirements and [how to apply](#).

Admission requirements

General university admission requirements:

All students are required to meet general university admission requirements.

[First-year](#) | [Transfer](#) | [International](#) | [Readmission](#)

Additional requirements:

The admission standards for majors in the Ira A. Fulton Schools of Engineering, shown below, are higher than minimum university admission standards. International students must meet the same admission standards, with the possible additional requirement of a minimum [English language proficiency](#) test score. If the university requires an English proficiency test score from the applicant, then admission to engineering requires a minimum TOEFL iBT score of 79 (internet-based test, taken in a testing center), a minimum IELTS score of 6.5, a minimum PTE score of 58, a minimum Duolingo English score of 105, or a minimum Cambridge English exam score of 176.

First-year admission:

1. minimum 1210 SAT combined evidence-based reading and writing plus math score or minimum 24 ACT combined score, **or** a minimum high school cumulative GPA of 3.00 in ASU competency courses, **or** class ranking in top 25% of high school class, **and**
2. no high school math or science competency deficiencies

Transfer admission requirements:

Transfer students with fewer than 24 transferable college credit hours:

1. minimum transfer GPA of 3.00 for fewer than 24 transfer hours, **and**
2. no high school math or science competency deficiencies, **and**

3. minimum 1210 SAT combined evidence-based reading and writing plus math score (or 1140 if taken prior to March 5, 2016) or minimum 24 ACT combined score, **or** a minimum high school GPA of 3.00 in ASU competency courses, **or** class ranking in top 25% of high school class

Transfer students with 24 or more transferable college credit hours must meet EITHER the primary OR the secondary criteria (not both):

Primary criteria

1. minimum transfer GPA of 3.00 for 24 or more transfer hours, **and**
2. no high school math or science competency deficiencies (if ASU Admission Services requires submission of a high school transcript)

Secondary criteria

1. minimum transfer GPA of 2.75 for 24 or more transfer hours, **and**
2. minimum GPA of 2.75 in ASU courses (or equivalents) in MAT 265, MAT 266, PHY 121 and PHY 122

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.

Change of Major requirements

[Admission requirements](#) for many majors in the Ira A. Fulton Schools of Engineering are higher than university admission standards.

Students should visit the [Change of Major form](#) for information about how to change a major to this program.

Transfer options

ASU is committed to helping students thrive by offering tools that allow personalization of the transfer path to ASU. Students may use [MyPath2ASU®](#) to outline a list of recommended courses to take prior to transfer.

ASU has [transfer partnerships](#) in Arizona and across the country to create a simplified transfer experience for students. These pathway programs include exclusive benefits, tools and resources, and they help students save time and money in their college journey.

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:

- Demonstrate integration of relationships of structure-property-performance-processing and apply them to modern engineering problems involving electronic, sustainability, polymeric,

ceramic, and other material systems using materials science characterization, computational and statistical methods.

- Solve complex engineering problems by identifying, formulating and applying principles of material science and engineering.
- Develop and conduct appropriate experimentation, by analyzing and interpreting materials characterization or computational datasets, and conduct appropriate experimentation and use engineering judgment to draw scientific and engineering conclusions applicable to modern engineering questions.

Global opportunities

Global experience

A [study abroad](#) experience can equip students with the skills they need to effectively and efficiently work with people anywhere in the world. They have the opportunity to gain an international viewpoint not only on engineering itself, but also on being a human in this increasingly global world.

Participation in a Global Education program helps students broaden their own horizons and open up possibilities they may have not known existed. Students gain valuable, resume-enhancing experience when studying abroad, and they stand out in a competitive field with the heightened cultural competency, and leadership and critical thinking skills they acquired when studying abroad.

The Ira A. Fulton Schools of Engineering recommends [these programs](#) for students majoring in materials science and engineering.

Career opportunities

Because materials science and engineering has such a wide variety of applications, graduates find jobs in virtually every field, such as aerospace, defense, the auto industry, telecommunications, microelectronics, computers, bioengineering, sports, renewable energy, academia and national research labs. They are among the highest paid scientists and engineers.

Program education objectives

The materials science and engineering program has the following educational objectives:

- Graduates can solve practical materials engineering challenges within their organizations by applying the required technical knowledge, skills and critical thinking.
- Graduates have made demonstrable progress toward a graduate degree or can be considered for a technical promotion within three to five years of graduation.
- Graduates can demonstrate professionalism, leadership, lifelong learning, professional development and the ability to work in teams, and hold positions of increasing responsibility within their organizations.
- Graduates can demonstrate an ethical approach to their profession, including consideration of economic, societal, cultural and environmental impact.

Student outcomes

Graduates are expected to have attained:

- an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

- an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety and welfare, as well as global, cultural, social, environmental and economic factors
- an ability to communicate effectively with a variety of audiences
- an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
- an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks and meet objectives
- an ability to identify, formulate and solve complex engineering problems by applying principles of engineering, science and mathematics
- an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental and societal contexts

An additional outcome for ASU materials science and engineering graduates is to demonstrate integration of relationships of structure, properties, processing and performance related to material systems using experimental, computational and statistical methods.

Example job titles and salaries listed below are not necessarily entry level, and students should take into consideration how years of experience and geographical location may affect pay scales. Some jobs also may require advanced degrees, certifications or state-specific licensure.

Career	*Growth	*Median salary
<u>Aerospace Engineer</u> ☀	6.1%	\$126,880
<u>Automotive Engineer</u> ☀	10.0%	\$96,310
<u>Computer Hardware Engineer</u> ☀	4.6%	\$132,360
<u>Materials Engineer</u> ☀	5.1%	\$100,140
<u>Materials Scientist</u> ☀	5.1%	\$104,380
<u>Mechanical Engineer</u> ☀	10.0%	\$96,310
<u>Microsystem Engineer</u>	3.3%	\$104,600
<u>Nanosystems Engineer</u>	3.3%	\$104,600
<u>Solar Energy Systems Engineer</u>	3.3%	\$104,600
<u>Supply Chain Engineer</u> ☀	11.7%	\$96,350

* Data obtained from the Occupational Information Network (O*NET) under sponsorship of the U.S. Department of Labor/Employment and Training Administration (USDOL/ETA).

☀ [Bright Outlook](#)

Professional licensure

ASU programs that may lead to professional licensure or certification are intended to prepare students for potential licensure or certification in Arizona. Completion of an ASU program may not meet educational requirements for licensure or certification in another state. For more information, students should visit the [ASU professional licensure](#) webpage.

Students should note that not all programs within the Ira A. Fulton Schools of Engineering lead to professional licensure.

Contact information

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