Materials Science and Engineering, BSE

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 is concerned with materials 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 make an impact by discovering and designing new and better materials to 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

At a Glance

- **College/School:** Ira A. Fulton Schools of Engineering
- **Location:** Tempe campus
- **Additional Program Fee:** Yes
- **Second Language Requirement:** No
- **First Required Math Course:** MAT 265 - Calculus for Engineers I
- **Math Intensity:** Substantial
Required Courses (Major Map)

2022 - 2023 Major Map
Major Map (Archives)

Concurrent Program Options

Students pursuing concurrent degrees (also known as a âdouble majorâ) 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 and master's degree with:

Materials Science and Engineering, MS
Nanoscience, PSM

Acceptance to the graduate program requires a separate application. During their junior year, eligible students are advised by their academic departments to apply.

Admission Requirements

General University Admission Requirements:
All students are required to meet general university admission requirements.

Freshman | Transfer | International | Readmission

Additional Requirements:

The admission standards for majors in the Ira A. Fulton Schools of Engineering are higher than minimum university standards. International students may have an additional English language proficiency criterion. Foreign nationals must meet the same admission requirements shown below with the possible additional requirement of a minimum TOEFL score. If the university requires a TOEFL score from the applicant (https://admission.asu.edu/international/undergrad-student), then admission to engineering requires a minimum TOEFL score of 550 (paper-based), 213 (computer-based), 79 on iBT (internet-based) or a minimum IELTS score of 6.5.

Freshman Admission:

1. minimum 1210 SAT combined evidence-based reading and writing plus math score or minimum 24 ACT combined score or 3.00 minimum ABOR GPA 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 less 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 3.00 minimum ABOR GPA, 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 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 all critical courses for Terms 1 and 2 (see major map for critical courses)

Change of Major Requirements

Admission requirements for many majors in the Ira A. Fulton Schools of Engineering are higher than university admission standards. [https://engineering.asu.edu/admission-requirements](https://engineering.asu.edu/admission-requirements)

Students should refer to [https://changemajor.apps.asu.edu](https://changemajor.apps.asu.edu) 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. Students may learn more about these programs by visiting the admission site: [https://admission.asu.edu/transfer/MyPath2ASU](https://admission.asu.edu/transfer/MyPath2ASU).
Global Opportunities

Global Experience
Students gain valuable, resume-enhancing experience when studying abroad. With over 250 programs available, study abroad allows students to tailor their experience to their unique interests and skill sets. Students in materials science and engineering are able to gain hands-on experience in countries like England and Columbia. In a competitive field, students stand out with the heightened cultural competency and leadership and critical thinking skills they acquired when studying abroad. Students can learn more on the Global Education website: [https://goglobal.asu.edu/](https://goglobal.asu.edu/).

Career Opportunities
Since materials science and engineering has such wide-scale applications, graduates find jobs in virtually every field such as aerospace, defense, 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 real-world materials engineering challenges within their organizations by applying the required technical knowledge, skills and critical thinking.
- Graduates will have made demonstrable progress toward a graduate degree or be considered for a technical promotion potentially within three to five years of graduation.
- Graduates can demonstrate professionalism, leadership, lifelong learning, professional development and 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 of materials science and engineering program are expected to have attained the following outcomes:

- an ability to identify, formulate and solve complex engineering problems by applying principles of engineering, science and mathematics
- 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 range of audiences
• 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 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 develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
• an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

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.

Career examples include but are not limited to those shown in the following list. Advanced degrees or certifications may be required for academic or clinical positions.

<table>
<thead>
<tr>
<th>Career</th>
<th>*Growth</th>
<th>*Median Salary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerospace Engineer 🌱</td>
<td>2.8%</td>
<td>$118,610</td>
</tr>
<tr>
<td>Automotive Engineer 🌱</td>
<td>3.9%</td>
<td>$90,160</td>
</tr>
<tr>
<td>Computer Hardware Engineer</td>
<td>1.6%</td>
<td>$119,560</td>
</tr>
<tr>
<td>Materials Engineer</td>
<td>1.5%</td>
<td>$95,640</td>
</tr>
<tr>
<td>Materials Scientist 🌱</td>
<td>3.4%</td>
<td>$99,460</td>
</tr>
<tr>
<td>Mechanical Engineer 🌱</td>
<td>3.9%</td>
<td>$90,160</td>
</tr>
<tr>
<td>Microsystem Engineer 🌱</td>
<td>1.3%</td>
<td>$103,380</td>
</tr>
<tr>
<td>Nanosystems Engineer 🌱</td>
<td>1.3%</td>
<td>$103,380</td>
</tr>
<tr>
<td>Solar Energy Systems Engineer 🌱</td>
<td>1.3%</td>
<td>$103,380</td>
</tr>
<tr>
<td>Supply Chain Engineer 🎖️</td>
<td>10.1%</td>
<td>$88,950</td>
</tr>
</tbody>
</table>

* 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 🌱 Green Occupation

**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: https://admission.asu.edu/academics/licensure.

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