AEROSPACE ENGINEERING, B.S.

The Saint Louis University Department of Aerospace and Mechanical Engineering offers an undergraduate program in aerospace engineering that equips students to shape the future by incorporating the latest industry trends and immersive experiential coursework.

A robust foundation in aerospace engineering concepts coupled with cross-disciplinary teamwork sets SLU students apart as problem solvers and as ethical innovators and leaders who are aware of the impact of engineering decisions in the context of the environment and society. Our program provides students with a comprehensive education in aerospace engineering with a focus on systems design.

Program Highlights

- Celebrating 90 years of aerospace engineering excellence.
- Curriculum: Strong foundation in engineering sciences, followed by courses in structures, thermal fluids, dynamics and controls. Students will also take aeronautical, astronautical, and design courses with flexible elective courses in cutting-edge disciplines and technologies.
- Career focus: Preparation for careers in aerospace engineering, both in aeronautics and astronautics, and graduate studies.
- Global reach: Saint Louis University-Madrid provides students with a unique international experience and opportunities for study abroad. These opportunities are available anytime during the first two years.
- Experiential learning: Our curriculum emphasizes hands-on learning from day one with a focus on practical experience and proactive engagement through design projects and research endeavors. A commitment to innovation, entrepreneurship, service learning, diversity, engagement, and teamwork is a part of the student experience.
- Capstone design experience: Two-semester capstone experience focusing on aerospace vehicle design from requirement development to prototyping.
- Research opportunities: Students can access a wide range of funded and voluntary research opportunities, collaborating closely with dedicated faculty members on diverse research projects.
- Cutting-edge facilities: State-of-the-art labs and equipment, including the WIND wind tunnel lab, AirCRAFT lab and Space Systems Research lab.
- Student engagement that fosters diversity and inclusion: Our students can join active student organizations, participate in national and international competitions, and collaborate with faculty on research projects. #Student organizations actively lead initiatives and organize outreach events to promote the involvement of underrepresented groups in engineering.
- Dedicated faculty and staff: Faculty, staff and students form a learning community that supports individual excellence and shared accomplishment.

Curriculum Overview

We take pride in our innovative aerospace engineering curriculum, carefully crafted to offer students a holistic education that seamlessly integrates theoretical knowledge with experiential learning. Our program stands out for its exceptional faculty, dedicated staff, and access to cutting-edge equipment and facilities, creating an immersive environment where students can immediately apply their knowledge to real-world scenarios.

Fieldwork and Research Opportunities

The benefits of SLU's aerospace engineering program include summer internships and cooperative education programs with industry, and federal labs in the St. Louis area and nationwide. These sites include NASA, the U.S. Department of Defense, the Boeing Company, Lockheed Martin Corporation and Northrop Grumman. Further, students can count the internship experience toward a technical elective by documenting their learning.

Qualified students can participate in funded undergraduate and graduate research opportunities with faculty members. Funded opportunities range from private industries to federal government research laboratories. Initiatives like SURGE and FIRE offer undergraduates hands-on research experiences, allowing them to work in University labs and apply their learning in practical settings, thereby enhancing their academic journey.

Careers

Successful SLU aerospace engineering alumni can be found at corporations and government agencies, including:

- Boeing
- General Dynamics
- General Electric
- Hughes
- Lockheed Martin
- NASA
- Northrop Grumman
- Pratt-Whitney
- Raytheon
- SpaceX
- Spirit AeroSystems
- Stratolaunch
- U.S. Air Force, Navy, and Army research centers

Admission Requirements

Begin Your Application (https://www.slu.edu/apply.php)

Saint Louis University also accepts the Common Application.

Freshman

All applications are thoroughly reviewed with the highest degree of individual care and consideration to all credentials that are submitted. Solid academic performance in college preparatory coursework is a primary concern in reviewing a freshman applicant's file.

To be considered for admission to any Saint Louis University undergraduate program, applicants must be graduating from an accredited high school, have an acceptable HiSET exam score or take the General Education Development (GED) test.

Transfer

Applicants must be a graduate of an accredited high school or have an acceptable score on the GED or HiSET.

Students who have attempted fewer than 24 semester credits (or 30 quarter credits) of college credit must follow the above freshmen admission requirements. Students who have completed 24 or more semester credits (or 30 quarter credits) of college credit must submit transcripts from all previously attended college(s).

In reviewing a transfer applicant's file, the Office of Admission holistically examines the student's academic performance in college-level coursework as an indicator of the student's ability to meet the academic rigors of Saint Louis University. Where applicable, transfer students will be evaluated on any courses outlined in the continuation standards of their preferred major.

International Applicants

All admission policies and requirements for domestic students apply to international students along with the following:

- Demonstrate English Language Proficiency (https://catalog.slu.edu/academic-policies/office-admission/undergraduate/english-language-proficiency/)
- All academic records must include an English translation. An official course-by-course transcript evaluation may be required and accepted.

Additional Admission Requirements

In addition to the general admission and matriculation requirements of Saint Louis University, applicants to SLU's engineering programs must meet the following requirements:

- **GPA**: Minimum cumulative 3.00 high school GPA for freshmen applicants and 2.70 college GPA for transfer applicants.
- **Coursework**: Fifteen total units of high school work are required: three or four units of English; four or more units of mathematics, including algebra I and II, geometry and precalculus (algebra II with trigonometry is not sufficient). Students should be prepared to start the first semester of freshman year in Calculus I or higher; three or four units of science, including general science, introduction to physical science, earth science, biology, physics or chemistry; two or three units of social sciences including history, psychology or sociology; and three units of electives.

Admission to the School of Science and Engineering's degree programs is based on a combination of secondary school grades, college admission test scores, co-curricular activities and attempted college coursework, as well as other indicators of the applicant's ability, career focus and character. This process respects the non-discrimination policy of the University and is designed to select a qualified, competent and diverse student body with high standards of scholarship and character, consistent with the mission of the University.

Tuition

Tuition	Cost Per Year
Undergraduate Tuition	$54,760

Additional charges may apply. Other resources are listed below:

Net Price Calculator (https://www.slu.edu/financial-aid/tuition-and-costs/calculator.php)

Information on Tuition and Fees (https://catalog.slu.edu/academic-policies/student-financial-services/tuition/)

Miscellaneous Fees (https://catalog.slu.edu/academic-policies/student-financial-services/fees/)

Information on Summer Tuition (https://catalog.slu.edu/academic-policies/student-financial-services/tuition-summer/)

Scholarships and Financial Aid

There are two principal ways to help finance a Saint Louis University education:

- **Scholarships:** Scholarships are awarded based on academic achievement, service, leadership and financial need.
- **Financial Aid:** Financial aid is provided through grants and loans, some of which require repayment.

Saint Louis University makes every effort to keep our education affordable. In fiscal year 2023, 99% of first-time freshmen and 92% of all students received financial aid (https://www.slu.edu/financial-aid/) and students received more than $459 million in aid University-wide.

For priority consideration for merit-based scholarships, apply for admission by December 1 and complete a Free Application for Federal Student Aid (FAFSA) by March 1.

For more information on scholarships and financial aid, visit the Office of Student Financial Services (https://www.slu.edu/financial-aid/).

Accreditation

The Aerospace Engineering, B.S. is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org (http://www.abet.org/), under the commission's General Criteria and Program Criteria for Aerospace and Similarly Named Engineering Programs.

Enrollment and Graduation Data for Aerospace Engineering (https://www.slu.edu/science-and-engineering/about/pdfs/ae-enrollment-graduation-data.pdf)

Learning Outcomes

The Aerospace Engineering, B.S. is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org (http://www.abet.org/), under the commission's General Criteria and Program Criteria for Aerospace and Similarly Named Engineering Programs.

Program Educational Objectives

The undergraduate program is designed to meet the following specific objectives in order to fulfill the departmental and institutional missions.

- To practice the principles of engineering in aerospace or allied organizations
- To pursue further learning in aerospace engineering or in allied disciplines
- To function as effective engineers with professional knowledge, skills and values

Student Outcomes

Graduates of the aerospace engineering program at Saint Louis University will have an ability to:

1. Identify, formulate and solve complex engineering problems by applying principles of engineering, science and mathematics.
2. 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.
3. Communicate effectively with a range of audiences.
4. 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.
5. Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. Acquire and apply new knowledge as needed, using appropriate learning strategies.

Requirements

Code	Title	Credits
University Undergraduate Core (https://catalog.slu.edu/academic-policies/academic-policies-procedures/university-core/)		**32-35**
Basic Engineering		
CSCI 1060	Introduction to Computer Science: Scientific Programming	3
ECE 1100	Electrical Engineering 101	2
ECE 1200	Computer Engineering 101	2
SE 1700 & SE 1701	Engineering Fundamentals and Engineering Fundamentals Studio	3
General Engineering Courses		
MENG 1011	Prototyping	1
MENG 2100X	Statics	3
MENG 2150	Dynamics	3
MENG 2310	Thermodynamics	3
MENG 3105	Mechanics of Solids	3
MENG 3110	Linear Vibrations	3
MENG 3111	Mechanics Laboratory	1
MENG 3200	Fluid Dynamics	3
AENG 3410	Analysis and Control of Linear Systems	3
MENG 3510X	Materials Science	3
Aerospace Engineering Courses		
AENG 2020	Introduction to Aero and Astro Engineering	1
AENG 3000	Performance	3
AENG 3050	Design of Space Missions	3
AENG 3150	Astrodynamics	3
AENG 3230	Compressible Flow	3
AENG 3240	Aerodynamics and Boundary Layer Flow	3
AENG 4004	Flight Vehicle Analysis and Design I	3
AENG 4014	Flight Vehicle Analysis and Design II	3
AENG 4110	Flight Vehicle Structures	3
AENG 4111	Aerospace Laboratory	1
AENG 4210	Propulsion	3
AENG 4400	Stability and Control	3
Technical Electives		
Select 9 credits from an approved AE list [1]		9
Basic Science & Mathematics		
CHEM 1110 & CHEM 1115	General Chemistry 1 and General Chemistry 1 Laboratory	4
PHYS 1610 & PHYS 1620	University Physics I and University Physics I Laboratory	4
PHYS 1630 & PHYS 1640	University Physics II and University Physics II Laboratory	4
MATH 1510	Calculus I	4
MATH 1520	Calculus II	4
MATH 2530	Calculus III	4
MATH 3550	Differential Equations	3
MATH 3270	Advanced Mathematics for Engineers	3
Total Credits		**126-135**

Non-Course Requirements

All School of Science and Engineering B.A. and B.S. students must complete an exit interview/survey near the end of their bachelor's program.

Continuation Standards

Students must maintain a minimum 2.00 GPA.

[1] Acceptable technical electives are courses at the 4000 level in the area of program major or the 3000 level or above in allied disciplines. (Allied disciplines include courses in engineering other than student's major, Mathematics – MATH, Computer Science – CSCI, Management – MGT, Pre-Law – PLS, Physics – PHYS, Chemistry – CHEM, and Biology – BIOL.) The student may also do an approved project or research independent study with a faculty member, or an approved internship with industry.

Roadmap

Roadmaps are recommended semester-by-semester plans of study for programs and assume full-time enrollment unless otherwise noted.

Courses and milestones designated as critical (marked with !) must be completed in the semester listed to ensure a timely graduation. Transfer credit may change the roadmap.

This roadmap should not be used in the place of regular academic advising appointments. All students are encouraged to meet with their advisor/mentor each semester. Requirements, course availability and sequencing are subject to change.

Course	Title	Credits
Year One		
Fall		
SE 1700 & SE 1701	Engineering Fundamentals and Engineering Fundamentals Studio	3
CHEM 1110 & CHEM 1115	General Chemistry 1 and General Chemistry 1 Laboratory	4
CORE 1500	Cura Personalis 1: Self in Community	1
CORE 1600	Ultimate Questions: Theology	3

MATH 1510	Calculus I (! requires proficiency exam; must earn a grade of C- or above)	4
CORE 1900	Eloquentia Perfecta 1: Written and Visual Communication	3
	Credits	**18**
Spring		
CSCI 1060	Introduction to Computer Science: Scientific Programming	3
MENG 1011	Prototyping	1
MATH 1520	Calculus II (must earn a grade of C- or above)	4
PHYS 1610 & PHYS 1620	University Physics I and University Physics I Laboratory	4
MENG 2100X	Statics	3
CORE 1200	Eloquentia Perfecta 2: Oral and Visual Communication	3
	Credits	**18**
Year Two		
Fall		
AENG 2020	Introduction to Aero and Astro Engineering	1
MENG 2310	Thermodynamics	3
PHYS 1630 & PHYS 1640	University Physics II and University Physics II Laboratory	4
MENG 3105	Mechanics of Solids	3
MATH 2530	Calculus III	4
	Credits	**15**
Spring		
AENG 3000	Performance	3
MENG 2150	Dynamics	3
CORE 3600	Ways of Thinking: Social and Behavioral Sciences	3
MENG 3200	Fluid Dynamics	3
CORE 2500	Cura Personalis 2: Self in Contemplation	0
MATH 3550	Differential Equations	3
CORE	Equity and Global Identities: Global Interdependence	0-3
	Credits	**15-18**
Year Three		
Fall		
AENG 3230	Compressible Flow	3
AENG 3150	Astrodynamics	3
MENG 3510X	Materials Science	3
MENG 3110	Linear Vibrations	3
MENG 3111	Mechanics Laboratory	1
MATH 3270	Advanced Mathematics for Engineers	3
CORE	Equity and Global Identities:Identities in Context	0-3
	Credits	**16-19**
Spring		
ECE 1100	Electrical Engineering 101	2
ECE 1200	Computer Engineering 101	2
AENG 3240	Aerodynamics and Boundary Layer Flow	3
AENG 3410	Analysis and Control of Linear Systems	3
CORE 1700	Ultimate Questions: Philosophy	3
Technical Elective [1]		3
	Credits	**16**
Year Four		
Fall		
AENG 4004	Flight Vehicle Analysis and Design I	3
AENG 4110	Flight Vehicle Structures	3
AENG 4400	Stability and Control	3
AENG 4210	Propulsion	3
Technical Elective [1]		3
AENG 4111	Aerospace Laboratory	1
	Credits	**16**
Spring		
AENG 4014	Flight Vehicle Analysis and Design II	3
AENG 3050	Design of Space Missions	3
Technical Elective [1]		3
CORE	Reflection-in-Action	0-3
CORE 3400	Ways of Thinking: Aesthetics, History, and Culture	3
CORE	Equity and Global Identities: Dignity, Ethics, and a Just Society	0-3
	Credits	**12-18**
	Total Credits	**126-138**

[1] Acceptable technical electives are courses at the 4000 level in the area of program major or the 3000 level or above in allied disciplines. (Allied disciplines include courses in engineering other than student's major, Mathematics – MATH, Computer Science – CSCI, Management – MGT, Pre-Law – PLS, Physics – PHYS, Chemistry – CHEM, and Biology – BIOL.) The student may also do an approved project or research independent study with a faculty member, or an approved internship with industry.

2+SLU

2+SLU programs provide a guided pathway for students transferring from a partner institution.

- Aerospace Engineering, B.S.(STLCC 2+SLU) (https://catalog.slu.edu/academic-policies/office-admission/undergraduate/2plusslu/stlcc/aerospace-engineering/)