AEROSPACE ENGINEERING, B.S.

Saint Louis University's School of Science and Engineering has developed an innovative, future-focused aerospace engineering program incorporating the latest industry trends to address the current and future needs of the profession and our society.

You will gain a solid foundation as a student in the aerospace engineering program at SLU through coursework and hands-on learning. You will become a problem solver while also being aware of the impact design decisions have in the context of ethics, the environment and society.

Program Highlights

- With easy access to a sophisticated computer-aided design laboratory, wind tunnels, a structures laboratory and a reconfigurable engineering flight simulator, SLU's aerospace engineering graduates gain invaluable experience that helps launch their careers and set them on a trajectory to shape our world and beyond.
- Our students have several extra-curricular opportunities to participate in national and international competitions and activities organized by the American Institute of Aeronautics and Astronautics (AIAA), SAE International, NASA and the Air Force Office of Scientific Research (AFOSR).
- Aerospace engineering students at SLU are also involved in student chapters of the AIAA, SAE International, Society of Women Engineers and SLU Robotics.

Curriculum Overview

Students in SLU's aerospace engineering program gain a solid foundation of coursework in fundamental engineering sciences before progressing toward traditional aerospace engineering courses. In addition, the program offers technical electives in broader areas of aerospace engineering to provide opportunities for students to gain greater depth and understanding. These engineering fundamentals and aerospace topics integrate into a sequence of two capstone courses that provide greater depth in design.

Fieldwork and Research Opportunities

SLU's aerospace engineering program benefits include summer internships and cooperative education programs available with industry in the St. Louis area and nationwide. Many of our students complete summer internship programs in federal labs and private industries. These sites include NASA, the U.S. Department of Defense, The Boeing Company, Lockheed Martin Corporation and Northrop Grumman.

Funded undergraduate and graduate research opportunities are available with faculty members in the program. Funded research grants ranging from private industries to federal government research laboratories are available for qualified students.

Careers

Corporations and government agencies where successful SLU aerospace engineering alumni can be found include:

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

Admission Requirements

Begin Your Application (http://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.

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/)
- Proof of financial support must include:
  - A letter of financial support from the person(s) or sponsoring agency funding the time at Saint Louis University
  - A letter from the sponsor's bank verifying that the funds are available and will be so for the duration of study at the University
- Academic records, in English translation, of students who have undertaken postsecondary studies outside the United States must include the courses taken and/or lectures attended, practical laboratory work, the maximum and minimum grades attainable, the grades earned or the results of all end-of-term examinations, and any honors or degrees received. WES and ECE transcripts are accepted.

Additional Admission Requirements

In addition to the general admission and matriculation requirements of the 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 freshmen 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 course work, 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.

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 in the form of grants and loans, some of which require repayment.

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

For information on other scholarships and financial aid, visit www.slu.edu/financial-aid (https://www.slu.edu/financial-aid/).

Accreditation

The aerospace engineering, biomedical engineering, civil engineering, computer engineering, electrical engineering, and mechanical engineering undergraduate curricula are accredited by the Engineering Accreditation Commission of ABET, www.abet.org (https://www.abet.org).

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

Learning Outcomes

Saint Louis University's undergraduate engineering programs are accredited by the Engineering Accreditation Commission of ABET (http://www.abet.org (http://www.abet.org/)).

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 demonstrate:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. 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
3. an ability to communicate effectively with a range of audiences
4. 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
5. 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
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to 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/)		
CORE 1200	Eloquentia Perfecta 2: Oral and Visual Communication	3
CORE 1600	Ultimate Questions: Theology	3
CORE 1700	Ultimate Questions: Philosophy	3
CORE 1900	Eloquentia Perfecta 1: Written and Visual Communication	3
CORE 2500	Cura Personalis 2: Self in Contemplation	0
CORE 3400	Ways of Thinking: Aesthetics, History, and Culture	3
CORE 3600	Ways of Thinking: Social and Behavioral Sciences	3
Major Requirements		
Basic Engineering		
CSCI 1060	Introduction to Computer Science: Scientific Programming	3
ECE 1100	Electrical Engineering 101	2
ECE 1200	Computer Engineering 101	2
Engineering Science Courses		
ESCI 1011	Prototyping	1
ESCI 1700 & ESCI 1701	Engineering Fundamentals and Engineering Fundamentals Studio	3
ESCI 2100	Statics	3

ESCI 2150	Dynamics	3
ESCI 2300	Thermodynamics	3
ESCI 3100	Mechanics of Solids	3
ESCI 3110	Linear Vibrations	3
ESCI 3111	Mechanics Laboratory	1
ESCI 3200	Fluid Dynamics	3
ESCI 3410	Analysis and Control of Linear Systems	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 3210	Gas Dynamics (Compressible Flow)	3
AENG 3220	Aerodynamics (Aerodynamics & 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
MENG 3510	Material Science	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		**125**

1

Technical electives provide an opportunity to expand the horizon of each student's program major or in areas related to program major. Students are encouraged to take courses at 4000-level in the area of program major or a 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 a project or research independent study with a faculty member and it is considered as equivalent to technical elective. The courses or independent study in these areas should be beyond the required courses within the curriculum.

Continuation Standards

Students must maintain a minimum 2.00 GPA.

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		
ESCI 1700 & ESCI 1701	Engineering Fundamentals and Engineering Fundamentals Studio	3
CHEM 1110 & CHEM 1115	General Chemistry 1 and General Chemistry 1 Laboratory	4
CORE 1900	Eloquentia Perfecta 1: Written and Visual Communication	3
MATH 1510	Calculus I (! requires proficiency exam; must earn a grade of C- or above)	4
CORE 1600	Ultimate Questions: Theology	3
	Credits	**17**
Spring		
CSCI 1060	Introduction to Computer Science: Scientific Programming	3
ESCI 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
ESCI 2100	Statics	3
	Credits	**15**
Year Two		
Fall		
AENG 2020	Introduction to Aero and Astro Engineering	1
ESCI 2300	Thermodynamics	3
MATH 2530	Calculus III	4
PHYS 1630 & PHYS 1640	University Physics II and University Physics II Laboratory	4
ESCI 3100	Mechanics of Solids	3
	Credits	**15**
Spring		
AENG 3000	Performance	3
ESCI 2150	Dynamics	3
CORE 3600	Ways of Thinking: Social and Behavioral Sciences	3
ESCI 3200	Fluid Dynamics	3
CORE 2500	Cura Personalis 2: Self in Contemplation	0
MATH 3550	Differential Equations	3
	Credits	**15**

Year Three		
Fall		
AENG 3230	Compressible Flow	3
AENG 3150	Astrodynamics	3
MENG 3510	Material Science	3
ESCI 3111	Mechanics Laboratory	1
ESCI 3110	Linear Vibrations	3
MATH 3270	Advanced Mathematics for Engineers	3
	Credits	**16**
Spring		
CORE 3400	Ways of Thinking: Aesthetics, History, and Culture	3
ECE 2001 & ECE 2002	Introduction to Electrical Engineering and Electrical Engineering Lab	4
AENG 3240	Aerodynamics and Boundary Layer Flow	3
Technical Elective [1]		3
ESCI 3410	Analysis and Control of Linear Systems	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
CORE 1700	Ultimate Questions: Philosophy	3
CORE 1905	Eloquentia Perfecta 1: Written & Visual Communication	3
Technical Elective [1]		3
	Credits	**15**
	Total Credits	**125**

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Technical electives provide an opportunity to expand the horizon of each student's program major or in areas related to program major. Students are encouraged to take courses at 4000-level in the area of program major or a 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 a project or research independent study with a faculty member and it is considered as equivalent to technical elective. The courses or independent study in these areas should be beyond the required courses within the curriculum.

2+SLU

2+SLU programs are formal transfer agreements for students seeking an associate degree at a partner institution.

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