

# MECHANICAL ENGINEERING, B.S.

At Saint Louis University's School of Science and Engineering, we have developed an innovative mechanical engineering curriculum that provides hands-on experiences complementing theoretical knowledge. Our students work with fluids, thermal, material, structural testing, mechatronics and robotics equipment, which provides an excellent opportunity to integrate theory with real-world applications.

Most mechanical engineering programs provide research and project opportunities, but our first-year students actively participate: turning wrenches, running experiments, analyzing and publishing their work. They don't have to wait until their junior year to get near the equipment, and they don't have to wait until their senior year to be in positions of leadership.

With easy access to sophisticated computer-aided design and simulation facilities, a structures laboratory and more, our graduates gain invaluable experience that helps launch their career and set them on a trajectory to shape our world and beyond.

## Curriculum Overview

Students of the mechanical engineering program at SLU will gain a solid foundation in the fundamental engineering sciences before progressing toward traditional mechanical engineering courses. The program offers technical electives in broader areas of structures, thermal fluids and design engineering to provide opportunities for students to gain a greater depth of understanding.

These engineering fundamentals and mechanical topics are then integrated into two capstone design courses during the senior year that provide greater depth in design. Students will learn the importance of design decisions not only on product design but on society as a whole. Well-equipped laboratory facilities emphasize measurement techniques and experimental methods that allow the student to verify the theory learned in the classroom.

The curriculum is designed to prepare students for professional careers in several fields of mechanical engineering involving product development and manufacturing. The curriculum also provides excellent preparation for graduate studies. In addition, four electives – two in the junior year and two in the senior year – allow students to explore their interests and shape their career paths.

## Fieldwork and Research Opportunities

Benefits of the mechanical engineering program also include several internship and career opportunities. Summer internships and cooperative education programs are available with industry in the St. Louis region as well as nationwide.

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

## Careers

Industry and government agencies have long recognized the quality of mechanical engineering graduates from Saint Louis University.

Successful alumni have found employment at corporations and government agencies such as:

- Boeing
- General Dynamics
- General Electric
- NASA
- Nooter/Eriksen
- Textron Systems
- 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 of 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 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	\$52,260

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 2022, 99% of first-time freshmen and 90% of all students received financial aid (<https://www.slu.edu/financial-aid/>) and students received more than \$445 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 information on other scholarships and financial aid, visit [www.slu.edu/financial-aid](http://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](http://www.abet.org) (<https://www.abet.org>).

Enrollment and graduation data for mechanical engineering is listed here ([https://www.slu.edu/science-and-engineering/\\_pdfs/2018-mechanical-engineering-enrollment-and-graduation-data.pdf](https://www.slu.edu/science-and-engineering/_pdfs/2018-mechanical-engineering-enrollment-and-graduation-data.pdf))

## Learning Outcomes

The undergraduate mechanical engineering program is accredited by the Engineering Accreditation Commission of ABET (<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 mechanical or allied organizations
- To pursue further learning in mechanical engineering or in allied disciplines
- To function as effective engineers with professional knowledge, skills and values

## Student Outcomes

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 ( <a href="https://catalog.slu.edu/academic-policies/academic-policies-procedures/university-core/">https://catalog.slu.edu/academic-policies/academic-policies-procedures/university-core/</a> )		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

#### Mechanical Engineering Courses

MENG 1000	Design Thinking	3
MENG 2400	Mechatronics Systems Design	3
MENG 2450	Engineering Experimentation	3
MENG 3001	Mechanical Engineering Lab	1
MENG 3010	Machine Design	3
MENG 3510	Material Science	3
MENG 3600	Manufacturing Process	3
MENG 4024	Mechanical Systems Design	4
MENG 4300	Heat Transfer	3
MENG 4304	Thermal Systems Design	3
MENG 4450	Programmable Logic Controllers and Robotics	3

#### Technical Electives

Select 12 credits (four courses) from an approved ME list. <sup>1</sup> 12

#### 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/Science Electives

Select one 3-credit courses from the AE/ME Department approved list. 3

**Total Credits** 129-132

## Non-Course Requirements

All 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.

<sup>1</sup> Technical electives provide an opportunity to expand the horizon of a student's program major or in areas related to program major. Students

are encouraged to take 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 a project or research independent study with a faculty member, which is considered equivalent to a technical elective. The courses or independent study in these areas should be beyond the required courses within the curriculum.

## 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
<b>Year One</b>		
<b>Fall</b>		
SE 1700 & SE 1701	Engineering Fundamentals and Engineering Fundamentals Studio	3
MENG 1011	Prototyping	1
MATH 1510	Calculus I (! requires proficiency exam; must earn a grade of C- or above)	4
CHEM 1110 & CHEM 1115	General Chemistry 1 and General Chemistry 1 Laboratory	4
CORE 1500	Cura Personalis 1: Self in Community	1
CORE	Equity and Global Identities: Identities in Context	0-3
<b>Credits</b>		<b>13-16</b>

#### Spring

MENG 1000	Design Thinking	3
CSCI 1060	Introduction to Computer Science: Scientific Programming	3
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
CORE 1600	Ultimate Questions: Theology	3
<b>Credits</b>		<b>17</b>

#### Year Two

##### Fall

ECE 1100	Electrical Engineering 101	2
ECE 1200	Computer Engineering 101	2
PHYS 1630 & PHYS 1640	University Physics II and University Physics II Laboratory	4
MENG 2100X	Statics	3
MATH 2530	Calculus III	4

CORE	Equity and Global Identities: Dignity, Ethics, and a Just Society	0-3
<b>Credits</b>		<b>15-18</b>
<b>Spring</b>		
MENG 2310	Thermodynamics	3
MENG 3105	Mechanics of Solids	3
MATH 3550	Differential Equations	3
MENG 2400	Mechatronics Systems Design	3
MENG 2450	Engineering Experimentation	3
CORE 2500	Cura Personalis 2: Self in Contemplation	0
CORE 1900	Eloquentia Perfecta 1: Written and Visual Communication	3
<b>Credits</b>		<b>18</b>
<b>Summer</b>		
Math / Science Elective		3
CORE	Equity and Global Identities: Global Interdependence	0-3
<b>Credits</b>		<b>3-6</b>
<b>Year Three</b>		
<b>Fall</b>		
MENG 3510	Material Science	3
MENG 2150	Dynamics	3
MENG 3200	Fluid Dynamics	3
CORE 3400	Ways of Thinking: Aesthetics, History, and Culture	3
Technical Elective <sup>1</sup>		3
CORE 3500	Cura Personalis 3: Self in the World	1
CORE 3600	Ways of Thinking: Social and Behavioral Sciences	3
<b>Credits</b>		<b>19</b>
<b>Spring</b>		
MENG 3010	Machine Design	3
MENG 3110	Linear Vibrations	3
MENG 3600	Manufacturing Process (MENG 2600)	3
MENG 3111	Mechanics Laboratory	1
MENG 4300	Heat Transfer	3
Technical Elective <sup>1</sup>		3
<b>Credits</b>		<b>16</b>
<b>Year Four</b>		
<b>Fall</b>		
MENG 4304	Thermal Systems Design	3
MENG 4450	Programmable Logic Controllers and Robotics	3
CORE 1200	Eloquentia Perfecta 2: Oral and Visual Communication	3
Technical Elective <sup>1</sup>		3
CORE	Eloquentia Perfecta: Writing Intensive	0-3
CORE 4000	Collaborative Inquiry	0-3
<b>Credits</b>		<b>12-18</b>
<b>Spring</b>		
MENG 4024	Mechanical Systems Design	4
MENG 3001	Mechanical Engineering Lab	1
CORE 1700	Ultimate Questions: Philosophy	3

Technical Elective <sup>1</sup>		3
CORE	Eloquentia Perfecta: Creative Expression	1-3
CORE	Reflection-in-Action	0-3
<b>Credits</b>		<b>12-17</b>
<b>Total Credits</b>		<b>125-145</b>

<sup>1</sup> Technical electives provide an opportunity to expand the horizon of a student's program major or in areas related to program major. Students are encouraged to take 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 a project or research independent study with a faculty member, which is considered equivalent to a 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.

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