

MECHANICAL ENGINEERING, B.S.

At Saint Louis University's Parks College of Engineering, Aviation and Technology, 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 a sophisticated computer-aided design laboratory, 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 Parks College will gain a solid foundation in the fundamental engineering sciences before progressing towards 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 a sequence of two capstone design courses during 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's Parks

College. 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
- 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 Parks College 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 Parks College of Engineering, Aviation and Technology 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 the student financial services office online at <https://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 mechanical engineering is listed here (<https://www.slu.edu/parks/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

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
Basic Engineering		
CSCI 1060	Introduction to Computer Science: Scientific Programming	3
ECE 2001 & ECE 2002	Introduction to Electrical Engineering and Electrical Engineering Lab	4
ESCI 1700 & ESCI 1701	Engineering Fundamentals and Engineering Fundamentals Studio	3
Engineering Science Courses		
ESCI 1011	Prototyping	1
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
Mechanical Engineering Courses		
MENG 1000	Design Thinking	3
MENG 2000	Foundation to Engineering Design	3
MENG 2450	Engineering Experimentation	3
MENG 2600	Manufacturing Process	3
MENG 3001	Mechanical Engineering Lab	1
MENG 3010	Machine Design	3
MENG 3510	Material Science	3
MENG 4024	Mechanical Systems Design	4

MENG 4300	Heat Transfer	3
MENG 4304	Thermal Systems Design	3
MENG 4450	Principles of Mechatronics	3
Technical Electives		
Select 12 credits (four courses) from an approved ME list. ¹		12
Basic Science & Mathematics		
CHEM 1110	General Chemistry I	4
& CHEM 1115	and General Chemistry I Laboratory	
PHYS 1610	University Physics I	4
& PHYS 1620	and University Physics I Laboratory	
PHYS 1630	University Physics II	4
& PHYS 1640	and University Physics II Laboratory	
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
Written and Oral Communication		
ENGL 1920	Advanced Writing for Professionals	3
Liberal Arts		
THEO 1000	Theological Foundations	3
PHIL 3400	Ethics & Engineering	3
Cultural Diversity ²		3
Humanistic Values Elective ³		6
Total Credits		122

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.

² Cultural Diversity elective courses must be selected from an approved Arts and Sciences list. See the description of the Parks College core for more information.

³ Humanistic values courses shall be chosen from humanities or social and behavioral sciences.
Humanities courses include fine arts (excludes applied, studio, and performance courses), literature (ENGL2000-ENGL 2600 Introduction to Short Fiction (3 cr), ENGL3000-ENGL3950, ENGL 4100 History of the English Language (3 cr), history, American studies and foreign languages (excludes English or native language), philosophy or theology.

Social and behavioral sciences courses include anthropology, communication, communication sciences and disorders, criminology and criminal justice, economics, education, political science, psychology, sociology, social work or public health.

⁴ The sequence of these two courses can be reversed.

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
ESCI 1011	Prototyping	1
CHEM 1110 & CHEM 1115	General Chemistry I and General Chemistry I Laboratory	4
ENGL 1920	Advanced Writing for Professionals	3
MATH 1510	Calculus I (! requires proficiency exam; must earn a grade of C- or above)	4
Credits		15
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
THEO 1000	Theological Foundations	3
Credits		17
Year Two		
Fall		
ESCI 2100	Statics	3
MENG 2000	Foundation to Engineering Design	3
MATH 2530	Calculus III	4
PHYS 1630 & PHYS 1640	University Physics II and University Physics II Laboratory	4
Humanistic Values Elective ³		3
Credits		17
Spring		
MENG 2450	Engineering Experimentation	3
ESCI 3100	Mechanics of Solids	3
ESCI 2300	Thermodynamics	3
ECE 2001 & ECE 2002	Introduction to Electrical Engineering and Electrical Engineering Lab	4
MATH 3550	Differential Equations	3
Credits		16

Year Three**Fall**

ESCI 2150	Dynamics	3
ESCI 3200	Fluid Dynamics	3
MENG 3510	Material Science	3
Cultural Diversity Elective ²		3
Technical Elective ¹		3

Credits	15
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Spring

ESCI 3110	Linear Vibrations	3
ESCI 3111	Mechanics Laboratory	1
MENG 2600	Manufacturing Process	3
MENG 3010	Machine Design	3
MENG 4300	Heat Transfer	3
Technical Elective ¹		3

Credits	16
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Year Four**Fall**

MENG 4304	Thermal Systems Design	3
MENG 4450	Principles of Mechatronics	3
Humanistic Values Elective		3
Technical Elective ¹		3

Credits	12
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Spring

MENG 3001	Mechanical Engineering Lab	1
MENG 4024	Mechanical Systems Design	4
PHIL 3400	Ethics & Engineering	3
Technical Elective ¹		3
Math / Science Elective		3

Credits	14
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Total Credits	122
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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)