PHYSICS, B.S.

Physics is the branch of science that studies the nature of matter, energy, and spacetime at the most fundamental level. It provides a foundation for all the natural sciences and engineering disciplines. Physics has brought such revolutions as relativity, quantum mechanics and the Big Bang theory, profoundly altering the way mankind views the universe.

Physicists have played a major role in the discovery of many phenomena leading to whole new technologies. The invention of the transistor, by physicists, has made the modern computer possible, while the development of lasers has led to diverse applications ranging from supermarket scanners to laser surgery. The physicist is a versatile problem solver and able to excel in many technical fields.

A training in physics leads to a broad-based understanding of natural phenomena, analytical and computer skills, experience with electronics and the operation of sophisticated equipment, an understanding of measurements and their limitations, and the ability to formulate and solve technical problems.

Physics students have a strong interest in mathematics, computers and science along with a desire to understand how the universe works. Students are interested in questions such as "Why do elementary particles behave the way they do?", "What is the nature of light?" or "How did the universe begin, and what will eventually happen to it?" Some students pursue double majors in mathematics, computer science or an engineering field.

Curriculum Overview

The B.S. in physics from Parks College stresses physics and its applications in areas such as engineering, computers and the sciences, and also includes opportunities to participate in faculty research.

Students of the physics program gain a solid foundation in analytical, computational and laboratory skills through course work in mathematics, computer science and physics. The physics curriculum includes courses in classical mechanics, quantum mechanics, electricity and magnetism, thermodynamics and statistical mechanics, as well as optics, electronics and modern physics.

Fieldwork and Research Opportunities

Benefits of the physics program also include several internship and career opportunities. The physics department employs some of its students as teaching and research assistants during the summer. Students have held summer internships at NASA-Langley, the Argonne National Laboratory and other laboratories. Students have worked both during the summer and during the year at local industries such as Boeing and Anheuser-Busch. Numerous opportunities exist for summer research in basic and applied physics in the Parks Summer Undergraduate Research Experience (SURE) program and in national laboratories and in National Science Foundation-sponsored programs at universities throughout the United States.

The programs stresses undergraduate research and applications of computers in physics. New state-of-the-art research facilities allow for students to work directly alongside faculty members on research projects.

Careers

Graduates with a bachelor's degree in physics enter a variety of careers that depend on the technical skills gained in college. Alumni are employed in product development and quality control in large industries such as RCA, Boeing or Lockheed-Martin. Alumni are computer specialists at Anheuser-Busch and other companies. Some are now involved in the marketing of technical products, while others are in management positions. A few graduates have entered military careers. Students frequently earn double majors, combining physics with mathematics, computer science or chemistry.

Admission Requirements

Freshman

Begin your application for this program at www.slu.edu/apply. Saint Louis University also accepts the Common App.

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 course work is a primary concern in reviewing a freshman applicant's file. College admission test scores (ACT or SAT) are used as an additional indicator of the student's ability to meet the academic rigors of Saint Louis University and are used as qualifiers for certain University scholarship programs. To be considered for admission to any Saint Louis University undergraduate program, the applicant must be graduating from an accredited high school or have an acceptable score on the General Education Development (GED) test.

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

Transfer

Begin your application for this program at www.slu.edu/apply.

Applicants must be a graduate of an accredited high school or have an acceptable score on the GED. An official high school transcript and official test scores are required only of those students who have attempted fewer than 24 transferable semester credits (or 30 quarter credits) of college credit. Those having completed 24 or more of college credit need only submit a transcript from 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.

International Applicants

Begin your application for this program at www.slu.edu/apply.

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

- Demonstrate English Language Proficiency (http://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, the B.S. physics program has the following additional requirements:

- GPA: Minimum cumulative 3.00 high school GPA for freshmen applicants and 2.70 college GPA for transfer applicants.
- ACT/SAT: ACT composite score of 24 or higher, or SAT composite score of 1160 or higher. ACT sub scores minimums of 22 in English, 24 in Mathematics, 22 in Reading Comprehension and 22 in Scientific Reasoning, or SAT Math sub score of 620.
- 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 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 requirements to Parks College of Engineering, Aviation and Technology degree programs are 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: awarded based on academic achievement, service, leadership and financial need.
- Financial Aid: provided in the form of grants and loans, some of which require repayment.

For priority consideration for merit-based scholarships, applicants should 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://finaid.slu.edu.

Learning Outcomes

1. Graduates will be able to understand the principles of physics and apply these principles to problems of fundamental and practical interest.
2. Graduates will be able to design and conduct experiments and analyze and interpret data.
3. Graduates will be able to collaborate effectively on teams.
4. Graduates will be able to communicate effectively and professionally in oral and written formats.
5. Graduates will be able to know about contemporary issues in science and technology.
6. Graduates will be able to understand the numerical formulation of scientific problems and be able to solve such problems utilizing at least one programming language or environment.

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<td>PHYS 4610</td>
<td>Quantum Mechanics</td>
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<td>PHYS 3410</td>
<td>Thermodynamics and Statistical Mechanics</td>
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<tr>
<td>PHYS 3510</td>
<td>Analog &amp; Digital Electronics</td>
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Additional Requirements

Select two additional upper division physics courses (minimum six credits) from the following:

- PHYS 3120 | Advanced Classical Mechanics | 4       |
- PHYS 4220 | Electricity & Magnetism II | 4       |
- PHYS 4620 | Application of Quantum Mechanics | 4       |

Research Experience

- PHYS 3860 | Physics Research I | 0       |
- PHYS 4870 | Physics Research II | 0       |
- PHYS 4880 | Senior Inquiry: Research Project | 3       |

Allied Electives

Select seven courses with Mentor

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<td>THEO 1000</td>
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<tr>
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Humanities Elective  
General Elect (Social/Behavioral Science or Humanities)  
Cultural Diversity Elective  
Open Elective  
Select one course  
Total Credits  

Cultural Diversity, Humanities, and Social/Behavioral Science elective courses must be selected from an approved list. See the Parks College introduction in this catalog for more information.

Continuation Standards
Students must have a GPA of 2.00 in Physics major/minor coursework to be retained in the major/minor.

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.

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