

# J.B. SPEED SCHOOL OF ENGINEERING



## J.B. Speed School of Engineering

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## About

The mission of the J.B. Speed School of Engineering is to serve the university, the Commonwealth of Kentucky, and the engineering profession by providing high-quality educational programs to all students; engaging in research and scholarship that will extend knowledge; and assisting the economic development of the regional, state, and national economies through technology transfer.

The Speed Scientific School was established as part of the University of Louisville in September 1924 as a result of a \$250,000 endowment from the James Breckenridge Speed Foundation. James Breckenridge Speed (1844–1912) was a descendant of the prominent Speed family and an industrial pioneer in the City of Louisville. An illustrious business leader, he oversaw the establishment of Louisville's street railway system, developed and operated large coal interests in Kentucky and was president of the Louisville Cement Company and the Ohio Valley Telephone Company. These industries, in which he maintained an active interest until his death in 1912, were a nucleus around which the City of Louisville and its greater metropolitan area grew to their present industrial stature. It is fitting that his memory be perpetuated in an engineering school bearing his name.

A pioneer class of 72 students started in Fall 1925 in chemical, civil, electrical, and mechanical engineering. The newly renovated Brigman Hall served as the main engineering building until 1942. Upon its inception, the Speed Scientific School offered a four-year Bachelor of Science degree based on a quarter plan, with alternating quarters of coursework and cooperative industry experience in the sophomore and junior years. To this day, the cooperative education program has been a mainstay of

the curriculum and Speed School remains as one of the few engineering schools with a mandatory program.

The engineering campus continued to grow through the generosity of Dr. William S. Speed and Mrs. Olive Speed Sackett, the children of James Breckenridge Speed and benefactors of his foundation, and Mrs. Virginia Speed, his wife. They made additional grants toward the erection of the James B. Speed Building (1942), Frederic M. Sackett Hall (1948), and William S. Speed Hall (1958). The Institute of Industrial Research (1946) was also constructed during this period and was later renovated to become the Laura Kersey Library, named after the first Speed School librarian. Kersey Library was again renovated in 2009 and is now the Duthie Center for Engineering.

The Speed School campus continued its growth on the south side of Eastern Parkway. The Chemical Engineering Building was built in 1967 and renamed in 1975 to honor Robert C. Ernst, who served as the third Dean of Speed School. The Vogt Building, a computerized engineering design center, was built in 1989 to honor Henry Vogt, whose family continues to play an important role in Speed School. Speed School then spread to the other side of Eastern Parkway with the construction of the New Academic Building in 1996. This building was later dedicated to Paul B. Lutz, an outstanding engineering faculty member and benefactor. Lutz Hall houses several research labs and centers and is home to the bioengineering program, the newest of the degree programs. In the 1970s the school had also added degree programs in computer engineering and industrial engineering. The newest addition to the Speed campus is the Shumaker Research Building (2006), housing a world-class cleanroom facility and numerous engineering research efforts.

In 2004, the J.B. Speed Scientific School officially changed its name to the J.B. Speed School of Engineering, reflecting its emphasis on engineering. It is also simply referred to as Speed School by those familiar with the school.

A formal definition of engineering was approved in 1979 by the Engineers Council for Professional Development, now known as the Engineering Accreditation Commission of ABET (<https://www.abet.org>), the accrediting board for engineering and technology programs. This definition still applies today:

*"Engineering is the profession in which knowledge of the mathematical and natural sciences gained by study, experience, and practice is applied with judgment to develop ways to utilize, economically, the materials and forces of nature for the benefit of mankind."*

Students of engineering should graduate with knowledge of engineering sciences and design, experience working in teams, have strong written and oral communication skills, and be well-versed on the impact of solutions in a global, economic, environmental, and social context. In particular, engineers have a duty to society to understand and abide by their discipline's Codes of Ethics. The preamble of the National Society of Professional Engineers (NSPE) Code of Ethics for Engineers states:

*"Engineering is an important and learned profession. As members of this profession, engineers are expected to exhibit the highest standards of honesty and integrity."*

*Engineering has a direct and vital impact on the quality of life for all people. Accordingly, the services provided by engineers require honesty, impartiality, fairness, and equity, and must be dedicated to the protection of the public health, safety, and welfare. Engineers must perform under a*

*standard of professional behavior that requires adherence to the highest principles of ethical conduct."*

## Structure

The original engineering programs are structured such that students will complete a program consisting of a combined eleven semesters (eight of academic work and three co-operative internships) in Departmental Studies to complete the Bachelor of Science degree, which may be followed by a fifth year in Graduate Studies for the Master of Engineering degree. To complete both programs in five years, Speed School students have a full course load during the summer semesters. These curriculum are designed as integrated five-year programs, with a cooperative education component, culminating in the Master of Engineering (MEng) degree. The Bachelor of Science and Master of Engineering programs are both accredited by the Engineering Accreditation Commission (EAC) of ABET (<http://www.abet.org/>). Additionally, the BS CSE degree is also accredited by the Computing Accreditation Commission (CAC) of ABET (<https://www.abet.org/>), under the Commission's General Criteria and the Program Criteria for Computer Science and Similarly Named Computing Programs.

The Engineering Fundamentals Department teaches engineering mathematics courses and other introductory engineering courses. The department focuses on creating a positive and supportive environment that helps students succeed in their studies and finalize their selection of engineering major. Departmental faculty strive to achieve excellence in teaching while introducing students to the engineering profession and providing them with fundamental engineering skills through a common set of core courses that begin in the freshman year. The department houses Speed School's Center for Teaching and Learning Engineering (CTLE) that fosters the development, evaluation and adoption of innovative teaching methods, both traditional and technology enabled.

The Bachelor of Arts in Computer Science (BA CS) program is structured to include eight semesters of academic work and two semesters of internship experience (during Summer semesters). Included within the planned hours of the program, are 30 credit hours designated as "Other Area of Study". These hours allow BA CS students a high degree of flexibility to pursue other interests, but it is highly encouraged that some or all of these hours be used toward the completion of a Minor.

## Speed School Administration

The complete and up-to-date list of Speed leadership (<http://engineering.louisville.edu/about/administration/>) is located on the Speed School website.

## Faculty and Departmental Information

The complete and up-to-date lists of departments (<http://engineering.louisville.edu/academics/departments/>) and faculty also are located on the Speed School website.

## Advising Services

Upon admittance to the J.B. Speed School of Engineering, students will be assigned an academic counselor. The academic counselors introduce students to a range of services provided by the J.B. Speed School of Engineering and will guide and support students as they advance through the engineering curriculum.

The J.B. Speed School of Engineering staffs professional academic counselors dedicated to:

- Assisting students in selecting appropriate required and elective courses
- Helping students determine choice of major
- Assisting students who are experiencing academic difficulties in their courses
- Maintaining complete and accurate files on each advisee in order to monitor progress toward career goals
- Assisting students to identify opportunities for engagement

All BS and MEng students are required to be advised by their academic counselor each semester. Students will be unable to register for classes until cleared by their academic counselor. Academic counselors are located in the Engineering Office of Student Success, located in the lower level of the J.B. Speed Building.

For further information about academic advising in the School of Engineering, call (502) 852-8084 or email the Advising Office (<http://louisville.edu/cgi-bin/uofl.mail?name=ssadvise>).

## About the Programs

### Engineering Programs

The engineering programs of the University of Louisville are offered through the J.B. Speed School of Engineering. The typical undergraduate program of study covers a period of four calendar years spanning eleven semesters, which includes three summer semesters. Study includes both academic course work and three semesters of cooperative work experience with industry, wherein a student is provided with conditions similar to those encountered in engineering practice.

Upon successful completion of undergraduate study and cooperative education, the student receives the Bachelor of Science degree in one of seven areas of specialization (see Programs of Study tab).

Students completing requirements for the Bachelor of Science degree at the J.B. Speed School of Engineering and achieving the required grade point average are encouraged to complete the requirements for the Master of Engineering (MEng) degree, if available in their field. The five-year BS plus MEng programs at the University of Louisville includes one year of graduate study beyond the four years of undergraduate studies.

Additionally, the Kentucky State Board of Licensure for Professional Engineers and Land Surveyors allows a student of the J.B. Speed School of Engineering who has completed 105 semester hours in an engineering curriculum to sit for the Fundamentals of Engineering examination as part of the requirements for registration as a Professional Engineer in Kentucky. The Bachelor of Science and Master of Engineering programs are both accredited by the Engineering Accreditation Commission (EAC) of ABET (<http://www.abet.org/>). Additionally, the BS CSE degree is also accredited by the Computing Accreditation Commission (CAC) of ABET (<https://www.abet.org/>), under the Commission's General Criteria and the Program Criteria for Computer Science and Similarly Named Computing Programs.

Students with a Bachelor of Science degree from another accredited program who come to the J.B. Speed School of Engineering to pursue an advanced degree normally enter into a Master of Science (MS) or doctoral (PhD) program. In addition to the previously mentioned seven areas of specialization, a master's program in Engineering Management is also offered by the Industrial and Systems Engineering Department. The Master of Science and Doctor of Philosophy degrees are available in all areas of specialization except for bioengineering which offers a PhD in Interdisciplinary Studies: Specialization in Translational Bioengineering.

Information about these degrees and other advanced degrees awarded by the University of Louisville may be obtained from the Graduate Catalog (<https://catalog.louisville.edu/graduate/programs-study/>).

The conferring of degrees by the University of Louisville is conditioned upon timely completion of all requirements in the opinion of the Dean and faculty and issuance of appropriate formal documents by the Registrar, regardless of participation in commencement.

## Applied Science Programs

The J.B. Speed School of Engineering currently offers one Applied Science Program, the Bachelor of Arts in Computer Science (BA CS). The BA CS program includes eight semesters of academic work and two semesters of internship experience (during Summer semesters). Included within the planned hours of the program, are 30 credit hours designated as "Other Area of Study". These hours allow BA CS students a high degree of flexibility to pursue other interests, but it is highly encouraged that some or all of these hours be used toward the completion of a Minor. Many sectors are currently in need of workers who both possess Computer Science skills and have expertise related to the field of application. The BA CS program, with an accompanying Minor in such fields, is designed to fulfill this need.

## Accreditation

The agency responsible for the accreditation of educational programs leading to degrees in engineering is the Engineering Accreditation Commission (EAC) of ABET (<https://www.abet.org>). The purpose of accreditation is to identify those institutions which offer professional programs in engineering and demonstrate that the programs meet specified criteria. Accreditation of engineering programs began in 1932 and the University of Louisville's engineering programs have been continuously accredited from this time.

The program must have documented student outcomes that support the program educational objectives. Attainment of these outcomes prepares graduates to enter the professional practice of engineering. Student outcomes are outcomes (1) through (7), plus any additional outcomes that may be articulated by the program.

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.

All undergraduate Engineering programs at Speed School demonstrate that these outcomes are attained through an assessment process

documented with the Engineering Accreditation Commission (EAC) of ABET (<https://www.abet.org>). The BS CSE degree program is also accredited by the Computing Accreditation Commission (CAC) of ABET (<https://www.abet.org>).

The Engineering Accreditation Commission (EAC) of ABET (<https://www.abet.org>) accredits programs at either the basic or advanced level. The curriculum requirements specify subject areas appropriate to engineering but do not prescribe specific courses. The program curriculum must provide adequate content for each area, consistent with the student outcomes and program educational objectives, to ensure that students are prepared to enter the practice of engineering. The general basic (baccalaureate) level curricular content:

- a minimum of 30 semester credit hours (or equivalent) of a combination of college-level mathematics and basic sciences with experimental experience appropriate to the program.
- a minimum of 45 semester credit hours (or equivalent) of engineering topics appropriate to the program, consisting of engineering and computer sciences and engineering design, and utilizing modern engineering tools.
- a broad education component that complements the technical content of the curriculum and is consistent with the program educational objectives.
- a culminating major engineering design experience that 1) incorporates appropriate engineering standards and multiple constraints, and 2) is based on the knowledge and skills acquired in earlier course work.

The general criteria for advanced level (master's) programs are:

- Fulfillment of basic level (baccalaureate) criteria.
- Fulfillment of program criteria appropriate to the masters level specialization area.
- One year of study beyond the basic level.

The University of Louisville is currently the only university in the country with programs having both baccalaureate- and master's-level accreditation. The accredited programs are the Bachelor of Science (BS) and Master of Engineering (MEng) programs in Bioengineering, Chemical Engineering, Civil Engineering, Computer Science and Engineering, Electrical Engineering, and Mechanical Engineering.

## Code of Student Conduct

The Code of Student Conduct is the University's policy regarding non-academic discipline of students. The general responsibility for non-academic discipline of all students enrolled in the University of Louisville shall be vested in the Office of the Vice President for Student Affairs. The Dean of Students Office has been delegated the responsibility of administering the Code of Student Conduct. The Code of Student Conduct is available online (<https://student.louisville.edu/code-student-conduct/>).

## Code of Student Rights and Responsibilities

The Code of Student Rights and Responsibilities is set forth in writing in order to give students general notice of certain of their rights and responsibilities at the University of Louisville. Further rights and responsibilities are set forth in other University rules and policies, including the Code of Student Conduct and academic unit bulletins.

The Code of Student Rights and Responsibilities is available online

(<https://student.louisville.edu/dean-students/policies/code-rights-and-responsibilities/>).

## Student Classroom Conduct

Students are expected to cooperate with all instructors to achieve an optimal learning environment. Conduct that disrupts such an environment will be dealt with and may result in the student being withdrawn from the course and/or facing additional academic penalties.

## Academic Dishonesty

A primary goal of the School of Engineering is to educate people who will serve the engineering community with competence and integrity. Academic dishonesty is a serious offense at the J.B. Speed School of Engineering (SSoE) because it undermines the bonds of trust and honesty between members of the community and defrauds those who may eventually depend upon our knowledge and integrity. Students are expected to recognize and to uphold standards of intellectual integrity. The School of Engineering assumes, as a minimum standard of conduct in academic matters, that the student is honest; credit for courses is given and received on the assumption and condition that all work submitted represents the student's own efforts. Academic dishonesty is defined in the Code of Student Rights and Responsibilities. It is the student's responsibility to become familiar with the Code.

In accordance with the Code of Student Rights and Responsibilities, academic dishonesty is prohibited at the University of Louisville.

1. An instructor who believes a student has committed an act of academic dishonesty will notify the student. This notification will include an explanation of the basis for the allegation and the academic penalties. Academic penalties are penalties associated with the class in question, such as re-submission of alternate assignment, F on the assignment, F for the course, etc. The student will have 10 school days to notify the instructor whether the student accepts or does not accept the academic penalties. Failure to notify the instructor within 10 school days will be interpreted as an acceptance of the academic penalty.

2. If the student accepts the instructor's academic penalties the following actions will occur:

- The instructor implements the academic penalties.
- The instructor notifies the department chair and SSoE Associate Dean of Undergraduate Affairs of the incident and imposed penalties within 10 school days of receiving the student's notification of accepting the penalties.
- The SSoE Associate Dean for Undergraduate Affairs will review the documents within 10 school days of receipt and issue a decision regarding whether any administrative sanctions will be imposed on the student by the J.B. Speed School of Engineering, and whether any University-wide sanctions will be recommended to the Provost. Administrative penalties may include suspension or expulsion from the J.B. Speed School of Engineering or the University of Louisville. The Dean will notify the student, the instructor and the Department Chair of this decision. The Dean will forward any recommended University-wide sanctions to the Provost.

3. If the student does not accept the instructor's academic penalties, the following actions will occur:

- The department chair, or, if the department chair is the instructor making the allegation, the SSoE Associate Dean of Undergraduate Affairs will meet with the student in a timely manner.
- At the meeting, the student will be provided an opportunity to present oral testimony and written evidence. The burden of establishing the student's guilt rests with the instructor, who must do so by a preponderance of the evidence. After the meeting, the department chair or the Associate Dean, as appropriate, will render a decision within 10 school days of meeting with the student and submit written documentation of the incident and decision to the SSoE Associate Dean of Undergraduate Affairs.
- If the student fails to appear at the meeting a final decision will be rendered by the department chair or SSoE Associate Dean of Undergraduate Affairs.
- The SSoE Associate Dean for Undergraduate Affairs will review the documents within 10 school days of receipt and issue a decision regarding whether any administrative sanctions will be imposed on the student by the J.B. Speed School of Engineering, and whether any University-wide sanctions will be recommended to the Provost. Administrative penalties may include suspension or expulsion from the J.B. Speed School of Engineering or the University of Louisville. The Dean will notify the student, the instructor and the Department Chair of this decision. The Dean will forward any recommended University-wide sanctions to the Provost.

As per the University of Louisville Code of Student Rights and Responsibilities (<https://student.louisville.edu/dean-students/policies/code-rights-and-responsibilities/>), an academic unit that determines that a student is guilty of academic dishonesty may impose any academic punishment on the student that it sees fit, including suspension or expulsion from the academic unit. A student has no right to appeal the final decision of an academic unit. However, a student who believes that they have been treated unfairly, have been discriminated against, or have had their rights abridged by the academic unit may file a grievance with the University Student Grievance Committee. The University of Louisville Student Complaint and Grievance Procedures are detailed here (<http://louisville.edu/provost/redbook/contents.html/chap6.html#ART68>). An academic unit that suspends or expels a student from the academic unit because the student has been found guilty of academic dishonesty may recommend to the University Provost in writing that the student also be suspended or expelled from all other programs and academic units of the University. Neither the student nor the academic unit shall have the right to appeal the Provost's decision. However, a student who believes that they have been treated unfairly, has been discriminated against, or has had their rights abridged by the issuance of a decision by the Provost may file a grievance with the University Student Grievance Committee.

## Student Complaints

If a student has a complaint about courses, grades, deficiencies, or decisions made by faculty members, advisors, department chairs, directors, etc., they should use the procedure outlined below.

- The student should first discuss the matter with the person involved and attempt to resolve the complaint through informal discussion.
- If there is no resolution, the student should discuss the matter with that person's supervisor or immediate superior in the department or office, who should attempt to mediate a resolution.
- If there is no resolution as the result of these discussions, the student should write to the appropriate department chair or director specifying the nature of the concern, with a copy of the letter to the Associate Dean for Undergraduate Affairs.

- If the student is unable to obtain a resolution through these procedures, he or she may request the Student Grievance Office to attempt informal mediation of the problem.

A student wishing to file a formal complaint should do so with the Dean of Students Office. See procedure here: <https://student.louisville.edu/dean-students/complaints-grievances> (<https://student.louisville.edu/dean-students/complaints-grievances/>).

## Undergraduate Programs

### A

- Applied Engineering (BS) (<https://catalog.louisville.edu/undergraduate/majors/applied-engineering-bs/>)

### B

- Bioengineering (BS) (<https://catalog.louisville.edu/undergraduate/majors/bioengineering-bs/>)

### C

- Chemical Engineering (BS) (<https://catalog.louisville.edu/undergraduate/majors/chemical-engineering-bs/>)
- Civil Engineering (BS) (<https://catalog.louisville.edu/undergraduate/majors/civil-engineering-bs/>)
- Computer Engineering (Minor) (<https://catalog.louisville.edu/undergraduate/minors/computer-engineering-minor/>)
- Computer Science (BA) (<https://catalog.louisville.edu/undergraduate/majors/computer-engineering-science-ba/>)
- Computer Science (Minor) (<https://catalog.louisville.edu/undergraduate/minors/computer-science-minor/>)
- Computer Science and Engineering (BS) (<https://catalog.louisville.edu/undergraduate/majors/computer-engineering-science-bs/>)
- Construction Operations (CERT) (<https://catalog.louisville.edu/undergraduate/certificates/construction-operations/>)

### E

- Electrical Engineering (BS) (<https://catalog.louisville.edu/undergraduate/majors/electrical-engineering-bs/>)

### I

- Industrial and Systems Engineering (BS) (<https://catalog.louisville.edu/undergraduate/majors/industrial-engineering-bs/>)
- Industrial and Systems Engineering (Minor) (<https://catalog.louisville.edu/undergraduate/minors/industrial-engineering-minor/>)

### M

- Mechanical Engineering (BS) (<https://catalog.louisville.edu/undergraduate/majors/mechanical-engineering-bs/>)