

BIOSTATISTICS, B.S.

Student Handbook (<https://sites.google.com/a/slu.edu/my-cphsj/home/undergraduate/undergraduate-public-health-programs/ugph-student-handbook/>)

Saint Louis University's Bachelor of Science in Biostatistics degree is offered through the College for Public Health and Social Justice, which is accredited by the Council on Education for Public Health. Using the American Statistical Association's guidelines for undergraduate data science programs, the curriculum trains students in the management, analysis, and interpretation of data within the context of public health and health care. Students gain skills that prepare them to enter the workforce or pursue graduate school after graduation.

What is the Field of Biostatistics

Biostatistics is a major for students interested in using data to understand and address health problems. Biostatisticians use analytic skills and critical thinking to work with data and answer questions currently challenging public health and health care today, such as:

- How do we predict the emergence of new infectious diseases?
- How do neighborhood environments interact with health behaviors and other factors to affect diabetes risk?
- How can genomic data be used to understand the role of genetics in risk, treatment, and prognosis of disease?
- How can medical record and insurance data be used to better understand burden, prevention, and control of poor health outcomes in our populations?
- **Interdisciplinary study.** Students explore principles of mathematics, computer programming, statistics and public health as they learn how the field of biostatistics addresses current and emerging public health issues.
- **Community impact.** Biostatisticians collaborate with researchers, policy makers, health care administrators and communities as they manage, analyze and interpret data to inform critical health decisions.
- **Employment outlook.** Biostatistics students gain skills that make them marketable for diverse, competitive-paying STEM jobs such as data analysts, data managers and research associates.
- **The Jesuit difference.** Saint Louis University is one of the few universities to offer an undergraduate degree in biostatistics and the only Catholic, Jesuit University to offer this program.

Curriculum Overview

SLU's biostatistics curriculum contains 30 credits of major courses that cover topics in public health and biostatistics, such as statistical computing, data management, applied biostatistics, epidemiology, and evidence-based public health.

Coursework uses a health context to emphasize the development of skills in data management and analysis, preparing students to enter the workforce or attend graduate school after college.

A core curriculum of humanities, science, math, social science, language and fine arts coursework, combined with general electives fills out the remainder of the 120 credits required for graduation. Many students use electives to pursue double majors or minors.

Additional degree options for students pursuing a biostatistics major at SLU include:

- An accelerated Program for high achieving students who wish to earn a B.S. in biostatistics in four years and a Master of Science in Health Data Science with one additional year of study; students apply to this selective program during their fifth semester of study.
- A pre-med track (p. 3) for students interested in going to medical school and a medical scholars track (p. 3) for students in the Medical Scholars Program (<https://www.slu.edu/scholars/medical-scholars/>).
- Honors courses for students in the Honors Program (<https://www.slu.edu/honors/>).

Fieldwork and Research Opportunities

Saint Louis University has a strong service component. Students can embody the institution's Jesuit mission by using the knowledge they gain in the classroom to serve others. Service-learning provides valuable field experience and helps biostatistics students connect with the St. Louis community.

Students can volunteer with health care providers and agencies that serve underprivileged communities, assist faculty with research projects, and apply to national internships and summer programs in data science. Internships can be completed on a volunteer basis or for general elective academic credit. Students can also become members of a variety of student organizations on campus to get to know other biostatistics students and engage in additional service, networking, and leadership opportunities.

Careers

The 21st century is often referred to as the era of information or big data. Skilled biostatisticians are needed to manage and analyze these data to better understand and address global public health issues.

Biostatisticians look forward to careers in government, industry, the non-profit sector and academia. The job outlook is excellent, as the U.S. government has reported a shortage of biostatistics professionals. The U.S. Bureau of Labor reports that job growth for biostatisticians is increasing more quickly than the national average.

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.

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 College for Public Health and Social Justice is fully accredited by the Council on Education for Public Health (CEPH).

View the Most Recent CEPH Self-Study (July 2016) (http://www.slu.edu/public-health-social-justice/pdfs/cphsj_self_study_august_2015_report.pdf)

Learning Outcomes

1. Graduates will be able to perform computations, derivations and calculations as they relate to calculus and linear algebra.
2. Graduates will be able to use standard statistical software to create and manage datasets and perform basic statistical tests.

3. Graduates will be able to appropriately communicate statistical results.
4. Graduates will be able to apply the public health model to biostatistical work.

Requirements

Code	Title	Credits
Required Core Courses		
BIOL 1240 & BIOL 1245	General Biology: Information Flow and Evolution and Principles of Biology I Laboratory	4
BIOL 1260 & BIOL 1265	General Biology: Transformations of Energy and Matter and Principles of Biology II Laboratory	4
BTM 2000	Introduction to Business Technology Management	3
BTM 3300 or CSCI 4710	Managing Databases and Big Data Databases	3
ENGL 1900	Advanced Strategies of Rhetoric and Research	3
HIST 1110	Origins of the Modern World to 1500	3
HIST 1120	Origins of the Modern World (1500 to Present)	3
MATH 1510	Calculus I	4
MATH 1520	Calculus II	4
MATH 2530	Calculus III	4
MATH 3110 or MATH 3120	Linear Algebra for Engineers Introduction to Linear Algebra	3
PHIL 1050	Introduction to Philosophy: Self and Reality	3
PHIL 2050	Ethics	3
THEO 1000	Theological Foundations	3
	Foreign Language proficient to 1020-level	6
	Literature, Fine Arts, or Performing Arts Elective	3
	Social Science Electives (Political Science, Psychology, Sociology, etc.)	6
Required Biostatistics Major Courses		
BST 3000	Intro to Statistical Computing	3
BST 3100	Applied Biostatistics I	3
BST 3200	Applied Biostatistics II	3
BST 4100	Theory of Biostatistics I	3
BST 4200	Theory of Biostatistics II	3
BST 4400	Introduction to Applied Data Management	3
EPI 4000	Intro Epidemiology: Foundations & Practice	3
PUBH 2100	Introduction to Global Health †	3
PUBH 3200	Evidence Based Public Health	3
PUBH 4100	Biological Basis of Public Health	3
General Elective Courses		
	Select an additional 28 credits of general electives to achieve the minimum 120 credits for graduation.	28
Total Credits		120

†
Fulfills the cultural diversity core requirement.

A total of 62 credits are required for completion of the core curriculum. Some core requirements have multiple options for satisfactory completion. A more detailed explanation of core curriculum requirements can be found in the *CPHSJ Undergraduate Public Health Student Handbook*.

Continuation Standards

- Cumulative GPA of at least 2.00
- Minimum grade of “C” in all B.S. in Biostatistics major courses
- Minimum grade of “C-” in all core courses
- Minimum grade of “D” in all remaining general elective courses counting toward the minimum 120 credits required for graduation

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.

General Track

Course	Title	Credits
Year One		
Fall		
BIOL 1240 & BIOL 1245	General Biology: Information Flow and Evolution and Principles of Biology I Laboratory	4
ENGL 1900	Advanced Strategies of Rhetoric and Research	3
HIST 1110	Origins of the Modern World to 1500	3
General Elective		3
General Elective		1
Credits		14
Spring		
BIOL 1260 & BIOL 1265	General Biology: Transformations of Energy and Matter and Principles of Biology II Laboratory	4
HIST 1120	Origins of the Modern World (1500 to Present)	3
MATH 1510	Calculus I	4
PUBH 2100	Introduction to Global Health †	3
Credits		14
Year Two		
Fall		
BTM 2000	Introduction to Business Technology Management	3
MATH 1520	Calculus II	4
PHIL 1050	Introduction to Philosophy: Self and Reality	3
Language Level 1 or higher		3
Social Science Elective		3
Credits		16
Spring		
BST 3000	Intro to Statistical Computing	3
MATH 2530	Calculus III	4
THEO 1000	Theological Foundations	3
Language Level 2 or higher		3

Literature, Fine Arts, or Performing Arts Elective		3
Credits		16
Year Three		
Fall		
BST 3100	Applied Biostatistics I	3
EPI 4000	Intro Epidemiology: Foundations & Practice	3
PUBH 3200	Evidence Based Public Health	3
General Elective		3
General Elective		3
Credits		15
Spring		
BST 3200	Applied Biostatistics II	3
MATH 3110 or MATH 3120	Linear Algebra for Engineers or Introduction to Linear Algebra	3
PHIL 2050	Ethics	3
General Elective		3
General Elective		3
Credits		15
Year Four		
Fall		
BST 4100	Theory of Biostatistics I	3
BST 4400	Introduction to Applied Data Management	3
BTM 3300 or CSCI 4710	Managing Databases and Big Data or Databases	3
General Elective		3
General Elective		3
Credits		15
Spring		
BST 4200	Theory of Biostatistics II	3
PUBH 4100	Biological Basis of Public Health	3
Social Science Elective		3
General Elective		3
General Elective		3
Credits		15
Total Credits		120

† Fulfills the cultural diversity core requirement.

Pre-Med and Medical Scholars Track

Course	Title	Credits
Year One		
Fall		
BIOL 1240 & BIOL 1245	General Biology: Information Flow and Evolution and Principles of Biology I Laboratory	4
CHEM 1110 & CHEM 1115	General Chemistry 1 and General Chemistry 1 Laboratory	4
ENGL 1900	Advanced Strategies of Rhetoric and Research	3
MATH 1510	Calculus I	4
Credits		15

Spring		
BIOL 1260 & BIOL 1265	General Biology: Transformations of Energy and Matter and Principles of Biology II Laboratory	4
CHEM 1120 & CHEM 1125	General Chemistry 2 and General Chemistry 2 Laboratory	4
HIST 1110	Origins of the Modern World to 1500	3
MATH 1520	Calculus II	4
Credits		15

Year Two

Fall		
BIOL 3020	Biochemistry and Molecular Biology	3
CHEM 2410 & CHEM 2415	Organic Chemistry 1 and Organic Chemistry 1 Laboratory	4
MATH 2530	Calculus III	4
PUBH 2100	Introduction to Global Health †	3
THEO 1000	Theological Foundations	3
(Medical Scholars Only: PPHS 1050)		0
Credits		17

Spring

BIOL 3040	Cell Structure & Function	3
BST 3000	Intro to Statistical Computing	3
CHEM 2420 & CHEM 2425	Organic Chemistry 2 and Organic Chemistry 2 Laboratory	4
PHIL 1050	Introduction to Philosophy: Self and Reality	3
PUBH 3200	Evidence Based Public Health	3
Credits		16

Year Three

Fall		
BST 3100	Applied Biostatistics I	3
EPI 4000	Intro Epidemiology: Foundations & Practice	3
MATH 3110	Linear Algebra for Engineers	3
PHYS 1310 & PHYS 1320	College Physics I and College Physics I Laboratory	4
SOC 1100	Introduction to Sociology	3
Credits		16

Spring

BST 3200	Applied Biostatistics II	3
BTM 2000	Introduction to Business Technology Management	3
PHIL 2050	Ethics	3
PHYS 1330 & PHYS 1340	College Physics II and College Physics II Laboratory	4
PSY 1010	General Psychology	3
Credits		16

Year Four

Fall		
BST 4100	Theory of Biostatistics I	3
BST 4400	Introduction to Applied Data Management	3
BTM 3300 or CSCI 4710	Managing Databases and Big Data or Databases	3
Language Level 1 or higher		3
Literature or Fine Arts Elective		3

(Medical Scholars Only: BIOL 3000+)*		0-3
Credits		15-18
Spring		
BST 4200	Theory of Biostatistics II	3
HIST 1120	Origins of the Modern World (1500 to Present)	3
PUBH 4100	Biological Basis of Public Health	3
Language Level 2 or higher		3
(Medical Scholars Only: BIOL 3000+)*		0-3
Credits		12-15
Total Credits		122-128

‡

Fulfills the cultural diversity core requirement.

*

Students in the Medical Scholars Program take an upper level biology course in each semester senior year. Pre-Med students who are not Med Scholars may take a different class in the place of this requirement, or *no* course, if they anticipate they will earn 120 credits before degree conferral.

Pre-Medical Students must consult with their Academic Advisor, and with SLU's Office of Pre-Health and Pre-Law Studies (<https://www.slu.edu/academics/undergraduate/pre-health-pre-law/>) to ensure the proper pre-medical course registrations.

Program Notes

Minimum of 120 credits including requirements listed above & cumulative GPA of at least 2.00 to graduate and/or remain in good standing with the program.

Approved English Literature Courses

ENGL 2000+ except for ENGL 2005, 3850-3870, 4000-4040, and 4100-4120.

See Arts & Sciences core B.S. requirements full listing.

Approved Fine Arts Courses

See Arts & Sciences core B.S. requirements for full listing.

Approved Social Sciences

Any courses from anthropology, criminal justice, economics, forensic science, political science, psychology and sociology.

Code	Title	Credits
ASTD 3200	The Urban Crisis	3
CMM 1000	Human Communication and Culture	3
CMM 2000	Communication Theory	3
CMM 2800	Communication Research	3
CSDI 1000	Introduction to Communication Sciences and Disorders	3
CSDI 3000	Cultural Linguistic Diversity	3
EDF 2240	Growth Development and Learning	3
EDF 3620	Culture and the Classroom	3
EDSP 4310	Ed & Psych of the Exp Ind	3
SWRK 1000	Introduction to Social Work	3
SWRK 3100	Social Policy for Social Justice	3

SWRK 3200	Dismantling Oppression: Exploring Equity & Inclusion	3
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Contact Us

Apply for Admission (<http://www.slu.edu/admission/>)

For additional admission questions please contact:

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314-977-3934

2+SLU

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

- Biostatistics, B.S. (STLCC 2+SLU)