

BIOCHEMISTRY, B.S. TO CHEMICAL BIOLOGY, MASTER'S ACCELERATED PROGRAM

Saint Louis University's bachelor's-to-master's program in chemical biology provides a strong foundation in chemistry and branches out into medicinal chemistry, pharmacology and molecular biology.

A five-year course schedule is provided to SLU undergraduates that demonstrates how to complete the undergraduate B.S. degree in biochemistry or biology together with a master's degree in chemical biology. The master's degree can either be a coursework-based M.A. degree or a thesis-based M.S. degree. This program provides excellent preparation for a career in the pharmaceutical and biotech industries.

For additional information, see the catalog entries for the following programs:

Biochemistry, B.S. (<https://catalog.slu.edu/colleges-schools/science-engineering/chemistry/biochemistry-bs/>)

Chemical Biology, M.A. (<https://catalog.slu.edu/colleges-schools/science-engineering/chemistry/chemical-biology-ma/>)

Chemical Biology, M.S. (<https://catalog.slu.edu/colleges-schools/science-engineering/chemistry/chemical-biology-ms/>)

Accreditation

The Bachelor of Science in Biochemistry has been continuously certified by the American Chemical Society since 2004.

Requirements

Existing SLU undergraduates pursuing a B.S. in biochemistry may apply to the accelerated bachelor's-master's (ABM) program after completing 75 credits (typically during the spring semester of their third year) if they have a GPA of 3.00 or higher, commensurate with the admission standards for the master's program in chemical biology. The application will include a personal statement and three letters of support, of which at least two must be from members of the SLU faculty.

If accepted into the program, students who have completed 90 undergraduate credits (typically during their fourth year) may apply up to 15 credits of graduate-level courses (5000-level and up) towards both the undergraduate and graduate degree requirements, assuming a grade of "B" or better. Students targeting a coursework-based M.A. degree will be mentored by the chemical biology program coordinator. Students targeting a thesis-based M.S. will take CHEB-5110 in the summer after having completed 90 credits (typically between years three and four) and select a research mentor.

Prior to 120 credits, students enrolled in the program will need to adhere to the continuation standards of their undergraduate major. After 120 credits (typically the fifth year), the chemical biology master's level program continuation requirements apply.

Roadmap

This roadmap is just one example of a semester-by-semester plan of study for this program. There are other plans students can and do take. The plan of study for each particular student is established in consultation with each student's academic advisor; *this roadmap does not replace academic advising appointments.*

Roadmap notes:

- This Roadmap assumes full-time enrollment unless otherwise noted.
- Courses/Milestones marked with an "!" are critical and must be completed in the semester listed in the Roadmap to ensure a timely graduation.
- Course availability and sequencing are subject to change.

M.A. in Chemical Biology Option

Course	Title	Credits
Year One		
Fall		
! CHEM 1130 & CHEM 1115	General Chemistry 1 for Majors and General Chemistry 1 Laboratory (! Satisfies CORE 3800: Ways of Thinking: Natural and Applied Sciences)	4
! BIOL 1240 & BIOL 1245	General Biology: Information Flow and Evolution and Principles of Biology I Laboratory	4
MATH 1510	Calculus I (! Satisfies CORE 3200: Ways of Thinking: Quantitative Reasoning)	4
Core courses		3-5
Credits		15-17
Spring		
! CHEM 1140 & CHEM 1125	General Chemistry 2 for Majors and General Chemistry 2 Laboratory	4
! BIOL 1260 & BIOL 1265	General Biology: Transformations of Energy and Matter and Principles of Biology II Laboratory	4
MATH 1520	Calculus II	4
Core course		3
Credits		15
Year Two		
Fall		
! CHEM 2430 & CHEM 2435	Organic Chemistry 1 for Majors and Organic Chemistry 1 Lab for Majors	4
! CHEM 2200 & CHEM 2205	Analytical Chemistry 1 and Analytical Chemistry 1 Laboratory (! Analytical 1 Lecture/Lab sequence can be taken either Fall or Spring semester)	4
PHYS 1610 & PHYS 1620 or PHYS 1310 or PHYS 1320	University Physics I ¹ or College Physics I or College Physics I Laboratory	4
Core courses		6
Credits		18

Spring

! CHEM 2440 & CHEM 2445	Organic Chemistry 2 for Majors and Organic Chemistry 2 Laboratory for Majors	4
PHYS 1630 & PHYS 1640 or PHYS 1330 or PHYS 1340	University Physics II ¹ or College Physics II or College Physics II Laboratory	4
Core courses		6
Credits		14

Year Three**Fall**

! CHEM 4610 & CHEM 4615	Biochemistry 1 and Biochemistry 1 Laboratory	4
CHEM 3330	Physical Chemistry 1	3
CHEM 3100	The Chemical Literature	1
Core courses		8-9
Credits		16-17

Spring

! CHEM 4620 & CHEM 4625	Biochemistry 2 and Biochemistry 2 Laboratory	4
! CHEM 3340 & CHEM 3345	Physical Chemistry 2 and Physical Chemistry Laboratory	4
CHEB 3970	Independent Research in Chemical Biology	1-3
General Electives		9
Credits		18-20

Year Four**Fall**

CHEM 5500 or CHEM 4500	Inorganic Chemistry (! Satisfies both Biochem BS requirement and MS elective) or Inorganic Chemistry	3
CHEB 3970	Independent Research in Chemical Biology	1-3
CHEM 5630	Introduction to Chemical Biology and Biotechnology (Only offered even years)	3
BIOL/BME elective ²		3
Core course		1
General Electives ⁶		
Credits		11-13

Spring

CHEM 5470	Medicinal Chemistry (! Satisfies Biochem BS elective requirement. Offered every Spring. Evening course.)	3
CHEB 3970	Independent Research in Chemical Biology (Requires completion of Senior Thesis)	1-3
PPY 5410	Molecular Pharmacology (Offered every Spring) ³	3
CHEB 5970	Research Topics	3
Core Course		2-3
General Elective		3
Credits		15-18

Summer

CHEB 5980	Graduate Independent Study in Chemical Biology	3
Credits		3

Year Five**Fall**

BIOL 5700	Advanced Molecular Biology	3
Elective ²		3
Elective ²		3
Credits		9

Spring

! Elective ²		3
Elective ²		3
Oral Examination		
Credits		6
Total Credits		140-150

M.S. in Chemical Biology Option

Course	Title	Credits
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Year One**Fall**

! CHEM 1130 & CHEM 1115	General Chemistry 1 for Majors and General Chemistry 1 Laboratory	4
! BIOL 1240 & BIOL 1245	General Biology: Information Flow and Evolution and Principles of Biology I Laboratory	4
MATH 1510	Calculus I	4
Core course		3-4
Credits		15-16

Spring

! CHEM 1140 & CHEM 1125	General Chemistry 2 for Majors and General Chemistry 2 Laboratory	4
! BIOL 1260 & BIOL 1265	General Biology: Transformations of Energy and Matter and Principles of Biology II Laboratory	4
MATH 1520	Calculus II	4
Core course		3
Credits		15

Year Two**Fall**

! CHEM 2430 & CHEM 2435	Organic Chemistry 1 for Majors and Organic Chemistry 1 Lab for Majors	4
! CHEM 2200 & CHEM 2205	Analytical Chemistry 1 and Analytical Chemistry 1 Laboratory	4
! PHYS 1610 & PHYS 1620 or PHYS 1310 <i>and</i> PHYS 1320	University Physics I ¹ or College Physics I <i>and</i> College Physics I Laboratory	4
Core course		6
Credits		18

Spring

! CHEM 2440 & CHEM 2445	Organic Chemistry 2 for Majors and Organic Chemistry 2 Laboratory for Majors	4
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! PHYS 1330 & PHYS 1340 or PHYS 1610 and PHYS 1640	College Physics II or University Physics I and University Physics II Laboratory	4
! PHYS 1630 & PHYS 1640 or PHYS 1310 and PHYS 1340	University Physics II ¹ or College Physics I and College Physics II Laboratory	4
Core courses		6
Credits		18
Year Three		
Fall		
! CHEM 4610 & CHEM 4615	Biochemistry 1 and Biochemistry 1 Laboratory	4
CHEM 3330	Physical Chemistry 1	3
CHEM 3100	The Chemical Literature	1
Core courses		8-9
Credits		16-17
Spring		
! CHEM 4620 & CHEM 4625	Biochemistry 2 and Biochemistry 2 Laboratory	4
! CHEM 3340 & CHEM 3345	Physical Chemistry 2 and Physical Chemistry Laboratory	4
CHEM 3970	Independent Research in Chemistry	1
General Electives		6
Credits		15
Summer		
CHEB 5110	Introduction to Chemical Biology Research I	1
Credits		1
Year Four		
Fall		
CHEM 5500 or CHEM 4500	Inorganic Chemistry (! Satisfies both Biochem BS requirement and MS elective.) or Inorganic Chemistry	3
BIOL 5700	Advanced Molecular Biology	3
CHEM 5630	Introduction to Chemical Biology and Biotechnology (Only offered every other year)	3
CHEM 3970	Independent Research in Chemistry	1
CHEM 5000	Introduction to Chemical Research	1
BIOL/BME elective ²		3
Core course		1
General Elective		3
Credits		18
Spring		
CHEM 5470	Medicinal Chemistry (Satisfies Biochem BS elective requirement. Offered every Spring. Evening Course.)	3
CHEB 5120	Introduction to Chemical Biology Research II	2
CHEM 3970	Independent Research in Chemistry (! Requires completion of Senior Thesis)	1

Core course		2-3
General Elective		9
Credits		17-18
Summer		
CHEB 5970	Research Topics	3
Credits		3
Year Five		
Fall		
CHEB 5990	Thesis Research	3
Elective ²		3
Submit Research Progress Report		
Credits		6
Spring		
CHEB 5990	Thesis Research	3
PPY 5410	Molecular Pharmacology (Offered Every Spring) ³	3
Submit and defend Master's Thesis		
Credits		6
Total Credits		148-151

¹ Engineering Physics (PHYS 1610-1640) is recommended. However, Physics (PHYS 1310-1340) also fulfills the physics requirement.

² Elective must be selected from a 5000+ course. Electives should be selected in consultation with the chemical biology program coordinator from the chemistry, biology, pharmacology or biochemistry departments.

BIOL/BME Elective: Students must complete three credit hours of a biology/BME course. These credits must be fulfilled by:

- i. BIOL 3010 – Evolutionary Biology
- ii. BIOL 3030 – Principles of Genetics
- iii. BIOL 3400 – Intro to Neuroscience
- iv. BIOL 4070 – Advanced Biological Chemistry
- v. BIOL 4250 – Neurobiology of Disease
- vi. BIOL 4430 – Principles of Virology
- vii. BIOL 4460 – Exercise Physiology
- viii. BIOL 4520 – Biochemical Pharmacology
- ix. BIOL 4540 – Human Systemic Physiology
- x. BIOL 4600 – Developmental Biology
- xi. BIOL 4630 – Foundations of Immunobiology
- xii. BIOL 4640 – General Microbiology
- xiii. BIOL 4720 – Cancer Biology
- xiv. BME 2200 – Applied Physiology for Engineers

³ The PPY 5110 and PPY 5120 sequence may be taken in place of PPY 5410. PPY 5110 and 5120 are fall semester courses.

Contact Us

For more information about undergraduate chemistry programs, please call 314-977-2850 or email chemundergrad@slu.edu.