

BIOCHEMISTRY, B.S. TO CHEMICAL BIOLOGY, M.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

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.

M.A. in Chemical Biology Option

| Course | Title | Credits |
|-------------------------|---|-----------|
| Year One | | |
| Fall | | |
| ! BIOL 1240 & BIOL 1245 | General Biology: Information Flow and Evolution and Principles of Biology I Laboratory | 4 |
| ! CHEM 1130 & CHEM 1115 | General Chemistry 1 for Majors and General Chemistry 1 Laboratory | 4 |
| MATH 1510 | Calculus I | 4 |
| A&S Core | | 3 |
| Credits | | 15 |
| Spring | | |
| ! BIOL 1260 & BIOL 1265 | General Biology: Transformations of Energy and Matter and Principles of Biology II Laboratory | 4 |
| ! CHEM 1140 & CHEM 1125 | General Chemistry 2 for Majors and General Chemistry 2 Laboratory | 4 |
| MATH 1520 | Calculus II | 4 |
| A&S Core | | 3 |
| Credits | | 15 |
| Year Two | | |
| Fall | | |
| ! CHEM 2200 & CHEM 2205 | Analytical Chemistry 1 and Analytical Chemistry 1 Laboratory | 4 |
| ! CHEM 2430 & CHEM 2435 | Organic Chemistry 1 for Majors and Organic Chemistry 1 Lab for Majors | 4 |
| ! PHYS 1310 & PHYS 1320 | College Physics I and College Physics I Laboratory | 4 |
| A&S Core | | 3 |
| Credits | | 15 |
| Spring | | |
| ! CHEM 2440 & CHEM 2445 | Organic Chemistry 2 for Majors and Organic Chemistry 2 Laboratory for Majors | 4 |
| ! PHYS 1330 & PHYS 1340 | College Physics II and College Physics II Laboratory | 4 |
| A&S Core | | 6 |
| Credits | | 14 |
| Year Three | | |
| Fall | | |
| ! CHEB 3970 | Undergraduate Research | 1 |
| CHEM 3100 | The Chemical Literature | 1 |
| CHEM 3330 | Physical Chemistry 1 | 3 |
| ! CHEM 4610 & CHEM 4615 | Biochemistry 1 and Biochemistry 1 Laboratory | 4 |

| | |
|---|------------|
| A&S Core | 6 |
| Credits | 15 |
| Spring | |
| ! CHEB 3970 Undergraduate Research | 1 |
| ! CHEM 3340 Physical Chemistry 2 & CHEM 3345 and Physical Chemistry Laboratory | 4 |
| ! CHEM 4620 Biochemistry 2 & CHEM 4625 and Biochemistry 2 Laboratory | 4 |
| A&S Core | 6 |
| Credits | 15 |
| Year Four | |
| Fall | |
| ! CHEB 3970 Undergraduate Research | 1 |
| ! CHEB-5630 Chemical Biology & Biotech | 3 |
| BIOL 3030 Principles of Genetics | 3 |
| CHEM 5500 Inorganic Chemistry or CHEM 4500 or Inorganic Chemistry | 3 |
| A&S Core | 6 |
| Credits | 16 |
| Spring | |
| ! CHEB 3970 Undergraduate Research | 1 |
| CHEM 5470 Principles of Medicinal Chemistry | 3 |
| PPY 5410 Molecular Pharmacology | 3 |
| Elective or A&S Core (if needed) | 9 |
| Credits | 16 |
| Summer | |
| ! CHEB-5980 Graduate Reading | 3 |
| Credits | 3 |
| Year Five | |
| Fall | |
| CHEB 5970 Research Topics | 3 |
| BIOL 5700 Advanced Molecular Biology | 3 |
| Graduate Elective [†] | 3 |
| Credits | 9 |
| Spring | |
| Oral Examination | |
| ! Graduate Elective [†] | 9 |
| Credits | 9 |
| Total Credits | 142 |

M.S. in Chemical Biology Option

| Course | Title | Credits |
|--|-------|-----------|
| Year One | | |
| Fall | | |
| ! BIOL 1240 General Biology: Information Flow and & BIOL 1245 Evolution and Principles of Biology I Laboratory | | 4 |
| ! CHEM 1130 General Chemistry 1 for Majors & CHEM 1115 and General Chemistry 1 Laboratory | | 4 |
| MATH 1510 Calculus I | | 4 |
| A&S Core | | 3 |
| Credits | | 15 |

| | | |
|--|--|-----------|
| Spring | | |
| ! BIOL 1260 General Biology: Transformations of Energy & BIOL 1265 and Principles of Biology II Laboratory | | 4 |
| ! CHEM 1140 General Chemistry 2 for Majors & CHEM 1125 and General Chemistry 2 Laboratory | | 4 |
| MATH 1520 Calculus II | | 4 |
| A&S Core | | 3 |
| Credits | | 15 |
| Year Two | | |
| Fall | | |
| ! CHEM 2200 Analytical Chemistry 1 & CHEM 2205 and Analytical Chemistry 1 Laboratory | | 4 |
| ! CHEM 2430 Organic Chemistry 1 for Majors & CHEM 2435 and Organic Chemistry 1 Lab for Majors | | 4 |
| ! PHYS 1310 College Physics I & PHYS 1320 or University Physics I <i>and</i> University or PHYS 1610 Physics I Laboratory <i>and</i> PHYS 1620 | | 4 |
| A&S Core | | 3 |
| Credits | | 15 |
| Spring | | |
| ! CHEM 2440 Organic Chemistry 2 for Majors & CHEM 2445 and Organic Chemistry 2 Laboratory for Majors | | 4 |
| ! PHYS 1330 College Physics II & PHYS 1340 or University Physics I <i>and</i> University or PHYS 1610 Physics II Laboratory <i>and</i> PHYS 1640 | | 4 |
| A&S Core | | 6 |
| Credits | | 14 |
| Year Three | | |
| Fall | | |
| CHEM 3100 The Chemical Literature | | 1 |
| CHEM 3330 Physical Chemistry 1 | | 3 |
| CHEM 3970 Undergraduate Research | | 1 |
| ! CHEM 4610 Biochemistry 1 & CHEM 4615 and Biochemistry 1 Laboratory | | 4 |
| A&S Core | | 6 |
| Credits | | 15 |
| Spring | | |
| ! CHEM 3340 Physical Chemistry 2 & CHEM 3345 and Physical Chemistry Laboratory | | 4 |
| CHEM 3970 Undergraduate Research | | 1 |
| ! CHEM 4620 Biochemistry 2 & CHEM 4625 and Biochemistry 2 Laboratory | | 4 |
| A&S Core | | 6 |
| Credits | | 15 |
| Summer | | |
| ! CHEB 5110 Intro to Chemical Biology Research I | | 1 |
| Credits | | 1 |

Year Four**Fall**

| | | |
|---------------------------|---|-----------|
| BIOL 3030 | Principles of Genetics | 3 |
| BIOL 5700 | Advanced Molecular Biology | 3 |
| ! CHEB-5630 | Chemical Biology & Biotech | 3 |
| CHEM 3970 | Undergraduate Research | 1 |
| CHEM 5500 or CHEM 4500 | Inorganic Chemistry or Inorganic Chemistry | 3 |
| A&S Core | | 3 |
| Credits | | 16 |

Spring

| | | |
|----------------------------------|---------------------------------------|-----------|
| ! CHEB 5120 | Intro to Chemical Biology Research II | 2 |
| CHEM 3970 | Undergraduate Research | 1 |
| PPY 5410 | Molecular Pharmacology | 3 |
| Elective or A&S Core (if needed) | | 9 |
| Credits | | 15 |

Summer

| | | |
|----------------|-----------------|----------|
| ! CHEB 5970 | Research Topics | 3 |
| Credits | | 3 |

Year Five**Fall**

| | | |
|---------------------------------|-----------------|----------|
| ! CHEB-5990 | Thesis Research | 3 |
| Graduate Elective [†] | | 6 |
| Submit Research Progress Report | | |
| Credits | | 9 |

Spring

| | | |
|-----------------------------------|-----------------------------------|------------|
| CHEM 5470 | Principles of Medicinal Chemistry | 3 |
| ! CHEB-5990 | Thesis Research | 3 |
| Submit and defend Master's Thesis | | |
| Credits | | 6 |
| Total Credits | | 139 |

†

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.