

New Program Proposal

Biochemistry and Biotechnology BS/MS, Accelerated Master's

The Biochemistry and Biotechnology (BCBT) Program offers an Accelerated MS degree program that allows students to simultaneously earn their BS and their MS in BCBT. Students accepted to the Accelerated MS degree program will be permitted to count up to 9 credits toward both degrees.

Students are encouraged to work closely with their BCBT undergraduate advisor, the Accelerated MS advisor, and the BCBT Program Director to ensure that courses are timed appropriately to maximize their benefits. It is strongly recommended that students meet with the Accelerated MS advisor as soon as possible, ideally before their junior year.

Students in the Accelerated MS program will complete the MS through the non-thesis coursework path. The thesis MS and Professional Science MS programs cannot be combined with this program.

Eligibility

Students need to have fulfilled the core curriculum requirements for the Bachelor of Science degree prior to applying for the Accelerated MS program.

Biology Core Courses

BIOL 1831	Introductory Biology: From Molecules to Organisms (MOTR BIOL 150L)	5
BIOL 2012	Genetics	3
BIOL 2013	Genetics Laboratory	2
BIOL 2482	Microbiology	3
BIOL 2483	Microbiology Laboratory	2
BIOL 3622	Cell Biology	3

Chemistry Core Course

CHEM 1111	Introductory Chemistry I (MOTR CHEM 150L)	5
CHEM 1121	Introductory Chemistry II	5
CHEM 2223	Quantitative Analysis in Chemistry	4
CHEM 2612	Organic Chemistry I	3

CHEM 2622	Organic Chemistry II	3
CHEM 2633	Organic Chemistry Laboratory	2
CHEM 3302	Physical Chemistry for The Life Sciences	3
Math and Physics Core Courses		
MATH 1030	College Algebra (MOTR MATH 130)	3
MATH 1035	Trigonometry	2
MATH 1100	Basic Calculus	3
or MATH 1800	Analytic Geometry and Calculus I	
PHYSICS 1011	Basic Physics I	3
PHYSICS 1012	Basic Physics II	3

Admission Requirements

Provisional Admission

Applicants are considered for provisional admission if they meet the following criteria.

- Earned 60 hours as an undergraduate
- Have a minimum GPA of 3.0 with a B or better in all core courses listed above
- Have approval from both their BCBT undergraduate advisor and BCBT Program Director

It is recommended to apply for provisional status as a junior, preferably in the first semester of junior year.

Graduate course options for Provisional students are listed below. Courses completed by undergraduate students who have been provisionally admitted to the Accelerated MS program can count towards both their BS and MS degrees. Courses in this phase will be charged at the undergraduate tuition rate; however, these courses will count toward the master's degree. Courses must be approved before the semester starts. Any 4000-level course taken before admission to the Accelerated MS program will apply to the undergraduate requirements only.

Seniors who have earned more than 105 credit hours cannot be considered for the Accelerated MS degree program.

Graduate Admission

Applicants are considered for graduate admission with the following criteria:

- Are in their final semester in undergraduate status
- Have a minimum GPA of 3.0 since being granted provisional status
- Submitted at least one positive recommendation letter from an UMSL BCBT faculty member
- Submitted to the BCBT Program Director a statement of purpose explaining why an advanced degree in BCBT is of interest and why the applicant merits consideration
- Have met with the BCBT Accelerated MS advisor

Based on the above information, the BCBT undergraduate advisor, Accelerated MS advisor and Program Director will determine whether the student can apply for graduate admission. The final decision concerning graduate admission is made by the BCBT Program Director and the Graduate School. Students admitted to the graduate program must take graduate courses until the completion of the MS degree.

Completing the BS and MS Degrees

To finish the BCBT BS degree, a student must also complete the following requirements.

Biochemistry and Biotechnology Core Courses

Choose one of the following:		3
BIOL 4602/6602	Molecular Biology (upper level Molecular Biology or equivalent course required for MS)	
BIOL 4608/6608	Synthetic Biology	
BIOL 4632/6632	Nucleic Acid Structure and Function	
BIOL 4642/6642	Plant Molecular Biology and Biotechnology	
BIOL 4614	Biotechnology Laboratory I	4
CHEM 4712	Biochemistry	3
CHEM 4733	Biochemistry Laboratory	2
CHEM 4722	Advanced Biochemistry (Chem 5722 required for MS)	3
or CHEM 5722	Advanced Graduate Biochemistry	
BIOL 4797	Biochemistry and Biotechnology Seminar	1
or CHEM 4797	Biochemistry and Biotechnology Seminar	

Biochemistry and Biotechnology Elective Courses

Choose two of the following courses:

6

CHEM 4772 or CHEM 5772	Physical Biochemistry Advanced Physical Biochemistry
CHEM 4774 or CHEM 5774	Introduction to Bioinformatics Bioinformatics
CHEM 5302	Foundations of Physical Chemistry
CHEM 5602	Advanced Organic Chemistry I - Physical Organic
CHEM 5694	Special Topics in Organic Chemistry
CHEM 5794	Special Topics in Biochemistry
CHEM 6787	Problem Seminar in Biochemistry
BIOL 4442 or BIOL 6442	Developmental Biology Advanced Developmental Biology
BIOL 4550 or BIOL 6550	Bacterial Pathogenesis Advanced Bacterial Pathogenesis
BIOL 4602 or BIOL 6602	Molecular Biology Advanced Molecular Biology
BIOL 4608 or BIOL 6608	Synthetic Biology Advanced Synthetic Biology
BIOL 4615 or BIOL 6615	Biotechnology Laboratory II (BIOL 6615 required for MS) Advanced Biotechnology Laboratory II
BIOL 4622 or BIOL 6622	Cellular Basis of Disease Advanced Cellular Basis of Disease
BIOL 4632 or BIOL 6632	Nucleic Acid Structure and Function Advanced Nucleic Acid Structure and Function
BIOL 4642 or BIOL 6642	Plant Molecular Biology and Biotechnology Advanced Plant Biology and Biotechnology
BIOL 4842	Immunobiology
BIOL 4905	Research ((must be supervised by BCBT faculty))
BIOL 4920 or BIOL 6920	Selected Topics in Biology (when relevant) Advanced Topics in Biology
CHEM 3905	Chemical Research (must be supervised by BCBT faculty)
CHEM 3643	Advanced Organic Chemistry Laboratory
BIOL 5012	Advanced Genetics

Total Hours**22**

Courses for both BS and MS Credit

The following Biology or Chemistry courses can count toward both the BCBT BS and BCBT MS degree, up to a maximum of 9 credit hours.

CHEM 4733	Biochemistry Laboratory	2
CHEM 5302	Foundations of Physical Chemistry	3
CHEM 5602	Advanced Organic Chemistry I - Physical Organic	3
CHEM 5694	Special Topics in Organic Chemistry	1
CHEM 5722	Advanced Graduate Biochemistry	3
CHEM 5772	Advanced Physical Biochemistry (CHEM 5722 required for MS)	3
CHEM 5774	Bioinformatics ¹	3
CHEM 5794	Special Topics in Biochemistry	1
CHEM 6787	Problem Seminar in Biochemistry	1
BIOL 4842	Immunobiology	3
BIOL 5012	Advanced Genetics	3
BIOL 5436	Advanced Applied Bioinformatics ¹	3
BIOL 6442	Advanced Developmental Biology	3
BIOL 6550	Advanced Bacterial Pathogenesis	3
BIOL 6602	Advanced Molecular Biology	3
BIOL 6608	Advanced Synthetic Biology	3
BIOL 6615	Advanced Biotechnology Laboratory II	4
BIOL 6622	Advanced Cellular Basis of Disease	3
BIOL 6632	Advanced Nucleic Acid Structure and Function	3
BIOL 6642	Advanced Plant Biology and Biotechnology	3
BIOL 6652	Advanced Virology	3
BIOL 6920	Advanced Topics in Biology	1

¹ One Bioinformatics course is required for the MS.

Other courses may be allowed upon approval of the Graduate Program Director.

Awarding of Degrees

The undergraduate degree will be awarded when the student meets the requirements for the BS degree, including at least 120 total credit hours,

completion of the BCBT core, electives, and laboratory requirements, and completion of the associated requirements. The student must work with the undergraduate advisor and/or the Accelerated MS advisor to apply to graduate. In their final semester in undergraduate status, the student must apply and be admitted to the graduate program to begin the following semester.

The graduate degree will be awarded when the student meets the requirements for the MS degree, including at least 30 credit hours of coursework at the graduate level. The student must work with the Accelerated MS advisor and Program Director to apply to graduate.

If the student fails to enroll for more than one year after receiving the bachelor's degree, the student can still earn the master's degree, but the graduate-level credits earned as an undergraduate cannot be used for the graduate degree.

Justification for request:

The proposed Accelerated MS program will provide an attractive option to current undergraduate students who wish to pursue their MS at UMSL. Unlike our previous 2+3 program, students pursuing an Accelerated MS will obtain their BS when they have completed the undergraduate requirements. In addition, they will be able to take more credits in undergrad status toward the MS (9 versus 6).