Student Handbook

Biochemistry & Biotechnology BS students

http://www.umsl.edu/~biotech/

Fall 2021

Welcome to the BCBT program! This handbook contains information about our faculty and for planning your degree. If you have additional questions, please feel free to email bcbtinfo@umsl.edu for more information or contact your advisor.

Entrance to the Science Complex at the University of Missouri-St. Louis

Biochemistry & Biotechnology (BCBT) Bachelor of Science Degree Program

Most degrees are offered by a particular department. Biochemistry & Biotechnology is somewhat unusual, in that it is a stand-alone Degree Program within the College of Arts and Sciences at UM-St. Louis. We offer a BS degree in "Biochemistry & Biotechnology". This is a rigorous BS degree, with 80 credit hours of math and science classes, including a broad background in both Biology and Chemistry. It is designed to prepare students to work in biochemistry or biotechnology research or to enter a graduate program. Based on the broad course requirements, it is also a great major for pre-medical and pre-professional students.

All BCBT faculty members have primary appointments either in the Department of Biology or in the Department of Chemistry & Biochemistry. They teach and operate research labs within their home department, but come together as an organized unit to offer the BS degree (as well as an MS degree) in BCBT. This ensures that BCBT students receive instruction from the most appropriate faculty without any inter-departmental barriers. The result is an integrated, interdisciplinary program that serves the needs and goals of our students.

The Science Complex

The BCBT program resides in the Science Complex, with five distinct sections: the Center for Nanoscience, Benton Hall, Research Wing, the Student Learning Building (SLB), and Stadler Hall. These units were constructed at different times. In the early days of campus, Benton and Stadler Halls actually were separate buildings. Although each of these units have now been joined into the Science Complex, the sections of the Building retain their original names, so faculty and students refer to each wing as if they were separate buildings. BCBT faculty members all have offices in the Science Complex. All the room numbers start with a letter, which denotes where the office is located:

Sxxx = Stadler Hall	Bxxx = Benton Hall
Rxxx = Research Building	M (or N) xxx = Center for Nanosciences (CNS)

Program Administration

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We are excited to have you here! Below is information that may be helpful as you are moving thru your degree program. Please feel free to ask questions and consult the links for more information.

Declaring a Major: Undergraduates can declare a major when they apply to the University. Once admitted, students can select/change their major by filling out the appropriate form in the College of Arts & Sciences (Room 303 Lucas Hall). The semester in which you declare that you are a BCBT major sets your "requirement term". You are entitled to graduate using the degree requirements that are associated with your requirement term. You can look up your requirement term in MyView under **Student Program/Plan**.

Degree Requirements for the BS in BCBT

Campus Requirements. Degree requirements are set at different administrative levels. The general education requirements are set by the campus and apply to all UMSL students. The general education requirements can be found in the current issue of the UMSL Bulletin. Each student must complete 42 credit hours of general education courses, including one course in American Government and history and one course related to Cultural Diversity. Each student is free to select his/her general education courses from approved lists and you can easily manage your own general education courses. The Dr. Marcus Allen Advising Center can be a great resource here – in particular, David McGraw advises BCBT undergraduates and pre-health focused students.

The campus also requires that each student complete a junior-level writing class, English 31xx. The English Department offers several 31xx courses to meet the needs of students with different interests and majors. Any English 31xx courses will meet the campus junior level writing requirement, but we routinely advise BCBT students to take English 3160, Writing in the Sciences.

BCBT Requirements

In addition to the campus-wide requirements, BCBT majors must meet the requirement specific to this degree. The current coursework requirements for the BS in BCBT are shown on

the next page. Students must complete the required and elective courses in math and science with a GPA of 2.0. The math and science courses must be graded; no courses may be taken on a satisfactory/unsatisfactory basis. A minimum grade of C- is required in any course that is to be used as a pre-requisite for another BCBT course.

Please note: one of the required courses are cross listed, meaning it appears in the class schedule under two different departments: the BCBT Senior Seminar is Biol/Chem 4797. Each semester, the schedule will list the courses in both the Chemistry and Biology department links. These are the same classes, so it makes no difference in which course you formally register. You may not receive credit for both.

A checklist of the math and science classes required for the BS degree also is included below**.** You can use this table to keep track of which classes you have completed.

Table 1. Math and Science Courses Required for the BS degree in BCBT

Biology Core Courses

_____ **Biol 1811**, Introductory Biology: From Molecules to Organisms (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 Courses

_____ **Chem 1111**, Introductory Chemistry I (5)

_____ **Chem 1121**, Introductory Chemistry II (5)

_____ **Chem 2223**, Quantitative Analysis (3)

_____ **Chem 2612**, Organic Chemistry I (3)

_____ **Chem 2622**, Organic Chemistry II (3)

_____ **Chem 2633**, Organic Chemistry Laboratory (2)

_____ **Chem 3302**, Physical Chemistry for Life Sciences (3)

Math and Physics Core Courses

_____ **Math 1030**, College Algebra (3)

_____ **Math 1035**, Trigonometry (2)

_____ **Math 1100**, Basic Calculus (3) **or Math 1800**, Analytic Geometry and Calculus I (5)

_____ **Phys 1011**, Basic Physics (4)

_____ **Phys 1012**, Basic Physics (4)

Biochemistry and Biotechnology Core Courses

_____ **Biol 4602**, Molecular Biology (3), **Biol 4608**, Synthetic Biology (3), or **Biol 4642**, Plant Molecular Biology and Biotechnology (3)

_____ **Chem 4712** Biochemistry (3)

_____ **Chem 4722** Advanced Biochemistry (3)

_____ **Chem 4733**, Biochemistry Laboratory (2)

_____ **Biol 4614**, Biotechnology Laboratory I (4) **or Biol 4615**, Biotechnology Laboratory II (4)

_____ **Chem/Biol 4797**, Biochemistry & Biotechnology Seminar (1)

Table 2. Elective opetions for the BS degree in BCBT – 6 credit hours chosen from the courses below:

Biol 3699	BCBT Internship
Biol 4442	Developmental Biology
Biol 4550	Bacterial Pathogenesis
Biol 4602	Molecular Biology
Biol 4608	Synthetic Biology
Biol 4622	Cellular Basis of Disease
Biol 4632	Nucleic Acids Structure and Function
Biol 4642	Plant Molecular Biology and Biotechnology
Biol 4652	Virology
Biol 4842	Immunobiology
Biol 4905	Research
Biol 4920	Selected topics in Biology (when relevant; see note below)
Chem 3643	Advanced Organic Chemistry Lab
Chem 3905	Research
Chem 4772	Physical Biochemistry
Chem 4774	Introduction to Bioinformatics
Chem 5694	Special Topics in Organic Chemistry (with permission)
Chem 5794	Protein Aggregation and Folding (with permission)

Note, If you take two of the options for one of the core categories (for instance, both Molecular Biology and Synthetic Biology), one of the two will count as an elective.

The “selected/special topics” courses vary in content from one semester to the next. Students can repeat a special topics course as long as the topic is different. These course listings rotate through a variety of topics, only some of which are appropriate for BCBT students. In general, if one of these classes is being taught by a faculty member from the BCBT program, then the class can be used as an elective. To be sure that a specific offering will count as an elective for BCBT, please check with your Advisor before you register for the class.

Major Field Achievement Test (MFAT): In addition to completing the required coursework, each BCBT student must take a major field achievement test (MFAT) in his/her final semester. You are not required to earn any specific minimum score in order to graduate, but it is a University requirement that you take the MFAT. The BCBT program cannot waive this requirement. This test is given as part of the BCBT senior seminar. If for any reason you miss the exam, contact the Program Director asap to reschedule to avoid graduation delays.

At least one semester before you expect to graduate, you should apply for your degree at the College of Arts and Sciences, in 303 Lucas Hall. In your final semester, the college will generate a list of graduates for the BCBT program.

Residency Requirements: The residency requirements for the BCBT degree are set by the College of Arts and Sciences. The College requires that 30 of the last 36 hours in the degree be completed in residence at UMSL. This must include at least 12 hours of courses within the major at the 2000 level or higher.

Minors: A minor is a secondary area of specialization. One earns a minor by completing a specified collection of courses in the area. You can review the requirements for a minor in the appropriate Departmental section of the UMSL Bulletin.

- By completing the courses required for the BS in BCBT, you automatically complete the requirements for a minor in Chemistry. All you have to do is apply for a minor in chemistry when you apply for your BS degree.
- To receive a minor in biology, you would only have to complete one additional course: Biol 1821.
- Minors in other areas may be pursued based on your interests or potential career goals.

Undergraduate Research: There is no requirement that students participate in undergraduate research. However, all of our students are strongly encouraged to participate in undergraduate research, which can count as credit for some of your elective hours. You participate in undergraduate research by enrolling in either Biol 4905 or Chem 3905. Each research faculty member has an assigned section of these courses.

If you are interested in participating in undergraduate research, review the specific research interests of the BCBT faculty. You can find this information on the BCBT web page. When you have identified a faculty member whose research is of interest, contact that individual to discuss research options within that lab. Each faculty member sets the parameters for undergraduate research within his/her lab. In your discussions, you should address issues such as the selection of a specific project, the number of hours expected per week, the scheduling of these lab hours, the nature of a final report, and whether to make a commitment for one or multiple semesters. Once you and the faculty member have come to a mutual agreement, contact the Department of your new research advisor to obtain a consent number so that you can enroll in either Biol 4905 or Chem 3905.

The research courses at UM-St. Louis are intended for research conducted on the campus. Research conducted off-campus is typically categorized as an internship. The BCBT program has an undergraduate internship option for student. These opportunities are reviewed individually on a case-by-case basis to ensure the opportunity is consistent with the program goals. Contact the program director for more information about requirements for rigor, timing, and follow-up assignments.

Academic Probation: To receive a degree from UMSL, a student must complete 120 credit hours, including all required courses, with an overall GPA of 2.0 or greater. Any time that a student's overall GPA falls below 2.0, she/he will be placed on academic probation by the College of Arts & Sciences. Students may be suspended if they have been on scholastic

probation for two or more semesters, not necessarily consecutive, and again become subject to probation for a third semester. These decisions are handled in the Dean's office; the program does not have authority in these matters.

Advising: It is a policy of the BCBT program to place an advising hold on every BCBT major for each new semester. This means MyView will not allow you to enroll in any courses until you have contacted your advisor. Please email your advisor to make an appointment to discuss your semester plans and degree progress prior to registration each semester. There are three advisors for the BCBT program. You are assigned an advisor based on your last name. After the meeting, the advisor will lift the advising hold and then you can register yourself in MyView.

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314-516-6749

For last names beginning with **G through N**:
Dr. Lynda McDowell
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314-516-5311

For last names beginning with **O through Z**:
Dr. Chung Wong
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314-516-5331

While we recommend you regularly consult with a BCBT program advisor, all BCBT students can visit advisors in the College of Arts And Science advising office. This office can help you with advising questions, registration issues, or degree audits. Please do not waste time and effort trying to figure out how to get around the advising hold. We have a vast amount of experience that shows that self advising does not work very well and frequently ends up extending the time required to earn your BS degree.

Prerequisites: The curriculum in BCBT is hierarchical: there are numerous prerequisites and it is important that you take courses in a specific sequence. MyView is programmed with the prerequisites for all courses. It will not allow you to register for a course unless you have met the prerequisites. When planning your classes, you can save yourself a lot of time by checking that you meet the prerequisites before you start fitting together a detailed class schedule. The prerequisites for the math and science classes are listed in the course descriptions, in the Bulletin, as well as on the BCBT web page. Your advisor cannot waive a prerequisite. Such waivers can only be granted by the instructor of the course (and is only done under rare circumstances).

Course Rotation: Most courses in the BCBT degree are offered on a regular schedule. A three year projected courseplan is published on the website, including likely scheduling in day or evening timeslots. Evening courses are defined as ones that start after 4:00 PM. The D/E designation is just to help you plan your schedule. There is no academic distinction between day and evening classes. They are taught by the same faculty and earn the same academic credit. The lower division courses tend to rotate between day and evening slots. 4000 level classes are much more likely to be in the evening.

Four Year Plan: The requirements for the BCBT degree can be completed in 8 semesters of full-time study. A representative four year plan of study can be found online. Obviously, there are many other ways one could arrange a four year schedule of classes. Even if you are planning a different timeline, you can use this table as a guide for the rough sequence in which you should take the math and science classes.

MyDegree: MyDegree is an online system that allows you to track the progress toward your degree. You can log from the UMSL homepage using your SSO ID and request an “audit” of

your degree. The audit will be generated for you within about 30 seconds. It will list all your degree requirements and will indicate which have been met and which have not. An audit will also list the courses in which you are currently enrolled. Over the last 2 years of your degree plan, you should closely monitor your progress prior to registering for classes.

The audit system defaults to the requirements for your specific requirement term. Thus If you compare notes with a fellow student who entered the program at a different time, the two degree audits may well give different results.

The degree requirements for the BS in BCBT are periodically updated by the Program Faculty. You are always entitled to use the policies associated with your requirement term. However, it is a general policy of the BCBT program to permit students, at their discretion, to adhere to the degree requirements in place at the time of their graduation. For example, if we have added a new elective since you entered the program, we will allow you to count the new elective toward your degree. However, this requires a formal modification of your degree program. When you are ready to graduate, be sure to make arrangements with your advisor to update your degree requirements and avoid any potential graduation delays.

Transfer Students: The Office of Transfer Services has established transfer guides from many local colleges and a more complete database of course equivalencies. For example, BIO 140 (*Principles of Biology I)* at Saint Louis Community College has been evaluated by the Department of Biology as equivalent to the UMSL Biol 1831. Thus when a student who has completed SLCC BIO 140 (with a grade of C or better) transfers to UM-St. Louis, MyDegree should automatically indicate that the requirement for UMSL Biol 1831 has been met. If you are transferring from a local community college or another 4-year institution in Missouri, then the odds are that all your science classes have already been evaluated for transfer equivalency.

Some transfer courses do not meet any BCBT degree requirements. For example, BIO 111, *Introduction to Biology I* at SLCC is an introductory biology course that transfers to UMSL

as Bio 1012. A student who transfers BIO 111 to UM-St. Louis will receive 4 credit hours toward the 120 credits required for graduation, but he/she would still have to take Biol 1831, because the BCBT degree requirement of Biol 1831 has not been met.

The Course Equivalency Database is updated as students transfer new courses to UM-St. Louis. If you are transferring from a small university from another part of the country, you may have to wait for a few weeks while the equivalencies are established for your courses. You may be asked to provide some information, such as course syllabi, to assist in this evaluation. This can be a particular problem if you are transferring courses from outside the United States. You will need to work with your advisor to put together a class schedule as best you can until the formal transfer equivalencies have been determined.

BCBT Departmental Awards: The BCBT program currently offers student awards each academic year. Faculty members in the BCBT program nominate students for these awards. The BCBT program also offer the Monsanto Scholarship each year. This is a needs-based award with specific requirements set by the donor. Each Spring semester, the requirements for the Monsanto Scholarship will be posted to solicit applications from all BCBT undergraduates.

Student Organizations: When you declare a BCBT major, you will be automatically added to the Organization of BCBT Majors within Canvas. The advisors and program director post information for BCBT majors – be sure to subscribe to the email alerts from Canvas or check for regular updates. This includes alerts about new elective options, clarifications of policies, and information that we receive about jobs with local companies. BCBT students are also welcome to join the Chemistry Club and/or the Biological Society. These are student-led organizations recognized by Student Affairs. Each organizes a number of social events during each academic year. In addition, watch for BCBT specific activities, including our annual research symposium.

Congratulations on starting the BCBT BS program – we are excited to have you in our program and hope that the answers to many questions are contained here. If we can be helpful in any other way or if you have additional questions, please feel free to email bcbtinfo@umsl.edu for more information or contact your advisor.