

Student Handbook: Masters of Science degree Program

Biochemistry & Biotechnology

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



View of the Science Complex across Bugg Lake.

Welcome to the BCBT Master of Science degree 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 graduate advisor.

Biochemistry & Biotechnology (BCBT) Masters of Science Degree Program

Biochemistry & Biotechnology is a stand-alone Degree Program within the Graduate School at UM-St. Louis. All the faculty members that participate in the MS degree program in BCBT have primary appointments either in the Department of Biology or in the Department of Chemistry & Biochemistry. They operate research labs within the jurisdiction of their home department, but they come together as an organized working unit to offer the MS degree and a BS degree in BCBT. This ensures that the BCBT students receive instruction from the most appropriate faculty without any inter-departmental barriers. The result is an integrated, interdisciplinary program that serves the instructional needs of the BCBT students.

Please note, we offer only an MS degree in “Biochemistry & Biotechnology”. We do not offer two separate degrees, one in biochemistry and another in biotechnology. Students interested in a doctoral degree are encouraged to complete their MS degree and apply to the Ph.D. program in Biology, with an emphasis in molecular biology (www.umsl.edu/~biology/), or to the Ph.D. program in Chemistry, with an emphasis in biochemistry (www.umsl.edu/chemistry).

The Science Complex

The BCBT program resides in the Science Complex. This building consists of five distinct sections. From west to east, these are the Center for Nanoscience, Benton Hall, Research Wing, the Student Learning Building, and Stadler Hall. These units were constructed at different times. In the early days, Benton and Stadler Halls 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.

The BCBT faculty members all have offices in the Science Complex. All the room numbers start with a letter, which denotes in which part of the Science complex the office is located.

Sxxx = Stadler Hall

Rxxx = Research Wing

Bxxx = Benton Hall

M (or N) xxx = Center for Nanosciences (CNS)

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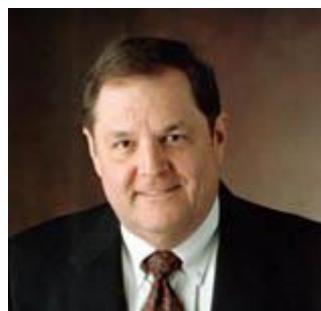
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Admission Requirements.

Applicants must submit a completed application form, three letters of recommendation, and transcripts of all previous coursework to the Graduate School. Although not required, submission of GRE scores is highly recommended and required for international applicants. International applicants whose native language is not English must also submit TOEFL scores. A score of 213 or better on the computer-based exam (or 550 on the paper-based exam) is required. Applicants must have a bachelor's degree in biology, chemistry, or biochemistry (or a similar field) from an accredited institution of higher learning, with a minimum grade point average overall and in biology and chemistry courses of 3.0 (on a 4.0 scale), and must have completed courses in biochemistry (equivalent to Biol/Chem 4712), genetics, and cell biology. Additional background coursework in microbiology, quantitative analysis, and molecular biology is highly desirable.

Requirement Term

The semester in which you enter the program establishes your “requirement term”. You are entitled to graduate under the rules and degree requirements that are in effect in your requirement term. A student can look up his/her requirement term in MyView under **Student Program/Plan**. The official rules for each term are defined by the BCBT pages in the UM-St. Louis Bulletin for each academic year.

Copies of the Bulletin for the current year and previous years can be found on the UMSL web page at
<http://www.umsl.edu/bulletin/>.

The BCBT program routinely allows MS students the option, at their discretion, to graduate under the rules in place at the time they graduate. For example, if the BCBT program adds a new elective course, students already in the program will be allowed to take the new course and count it as an elective.

Degree Requirements

Non-Thesis MS students.

The MS in BCBT requires 30 credit hours of coursework. This consists of 15 credit hours of required core courses, and 15 credit hours of electives. The list of core and elective courses is shown in **Table 1**. The non-thesis program includes a mix of full-time and part-time MS students. Many students are working full time and adjust their course load each semester in response to the demands of their job. A student can defer for one semester and resume normal registration the following semester. However, if a student requires additional time off, he/she should request a leave of absence or the student will have to reapply to the Graduate School.

BCBT Core

The core consists of five required courses. Students must take Chem 5722, Advanced Biochemistry, and Biol 6615, Biotechnology Lab II. All students must take one of the Bioinformatics courses, either Chem 5774, Bioinformatics, or Biol 5794, Applied Bioinformatics. A student must take one of the core molecular biology courses, either Biol 6602, Advanced Molecular Biology, or Biol 6608, Synthetic Biology. If both courses are taken within one of the categories, one counts for the core and the other counts toward the electives.

The final core course is Biol 6889, Graduate Seminar. This course requires extensive reading and discussion of current literature. Having taken prior graduate courses is a significant advantage with respect to Biol 6889. Thus we recommend that students delay Biol 6889 until late in their program. Only sections taught by a BCBT faculty member will count towards the degree.

Students are required to complete 15 credit hours of electives. A wide range of electives are offered. Within the courses approved as BCBT electives, there are no restrictions on the students' choice of electives. This allows students to tailor their degree to a particular emphasis area.

Table 1. M.S. Degree in Biochemistry & Biotechnology, non-thesis option

- _____ Chem 4722 *Advanced Biochemistry* (3 credit hours)
- _____ Chem 5774 *Bioinformatics* (3 credit hours) **or**
- _____ Biol 5436 *Applied Bioinformatics* (3 credit hours)
- _____ Biol 6615 *Advanced Biotechnology Laboratory II* (4 credit hours)
- _____ Biol 6602 *Advanced Molecular Biology* (3 credit hours) **or**
- _____ Biol 6608 *Advanced Synthetic Biology* (3 credit hours)
- _____ Biol 6889 *Graduate Seminar* (2 credit hours)

Electives (15 credit hours):

- _____ Chem 4733 *Biochemistry Laboratory* (2 credit hours)
- _____ Chem 4764 *Interdisciplinary Topics in Biochemistry* (3 credit hours)
- _____ Chem 5694 *Special Topics in Organic Chemistry* (when relevant; 1-3 credit hours)
- _____ Chem 5772 *Physical Biochemistry* (3 credit hours)
- _____ Chem 5794 *Special Topics in Biochemistry* (1-3 credit hours)
- _____ Chem 6787 *Problem Seminar in Biochemistry* (1 credit hour)
- _____ Chem 6905 *Graduate Research* (1-5 credit hours)**
- _____ Biol 4550 *Advanced Bacterial Pathogenesis* (3 credit hours)
- _____ Biol 4842 *Immunobiology* (3 credit hours)
- _____ Biol 5069 *Topics in Cellular and Molecular Biology* (1 credit hour)
- _____ Biol 6442 *Advanced Developmental Biology* (3 credit hours)
- _____ Biol 6602 *Advanced Molecular Biology* (3 credit hours)
- _____ Biol 6608 *Advanced Synthetic Biology* (3 credit hours)
- _____ Biol 6622 *Advanced Cellular Basis of Disease* (3 credit hours)
- _____ Biol 6632 *Advanced Nucleic Acid Structure and Function* (3 credit hours)
- _____ Biol 6642 *Advanced Plant Biology and Biotechnology* (3 credit hours)
- _____ Biol 6652 *Advanced Virology* (3 credit hours)
- _____ Biol 6699 *Graduate Internship in Biotechnology* (1-4 credit hours)
- _____ Biol 6889 *Graduate Seminar* (2 credit hours)
- _____ Biol 6905 *Graduate Research* (1-5 credit hours)**
- _____ Biol 6920 *Topics in Biology* (when relevant; 2-5 credit hours)

** Maximum of 5 credit hours total between Chem 6905 and Biol 6905 Graduate Research courses

Course Rotation.

Most classes in the MS curriculum are taught once a year, in either the Fall or the Spring semester. To help you plan your classes, the projected three year course plan can be found [online](#). All classes are offered in the evenings to accommodate working students.

Research Courses

Non-thesis students are encouraged to gain some research experience by registering for Chem 6905 or Biol 6905. Enrolling in these research courses allows students to receive academic credit for performing a research project in the lab of one of the BCBT faculty members. Non-thesis MS students can count up to 5 credit hours of research as elective hours in the MS program. Enrollment in a research course is by mutual agreement between the student and a faculty member. Students interested in this option should review the descriptions of faculty research area on the BCBT web page (<http://www.umsl.edu/~biotech/about/faculty.html>). The student should request a meeting with a potential Research Advisor and discuss such issues as the topic of a research project, space availability in the lab, lab hours expected per credit hour, the scheduling of lab hours, and the nature of the final research report. If there is a mutual agreement between the student and the faculty member, the student should contact the home department of the Research Advisor for a consent number that is required to enroll. Students are required to earn a minimum of 3.0 GPA in non-research courses to graduate; grades in research courses are not used in the program GPA calculation.

Special Topics Courses.

The Biol 6920 and Chem 5794 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 each time. Both Chem 5694 and Biol 6920 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 of Chem 5694 or Biol 6920 will count as an elective for BCBT, please check with a Graduate Advisor before you register for the class.

Advising

Students enroll themselves in classes using the [MyView system](#). It is the policy of the BCBT program to place an advising hold on every student for every semester. MyView will not allow you to register until this advising hold has been removed by a Graduate Advisor. There are two faculty Graduate Advisors for the MS program in BCBT.

Professor [Chung Wong](#) (A-L)

Office: M203

Professor [Bethany Zolman](#) (M-Z)

Office: R424

You can contact your advisor for help with registration, according to the first letter of your last name. If your class situation is simple and you are confident that you know what you need to take, it may be sufficient to simply email your course preferences to your advisor. If your advisor concurs, the hold will be lifted. Once the hold is lifted, you are expected to log into your account in MyView and register for your classes.

Courses numbered at the 5000- and 6000-level are graduate courses. The courses at the 4000-level are taken both by graduate students and senior undergraduate students. When any student

attempts to enroll in a 4000-level class, MyView checks for prerequisites and routinely fails to allow graduate students to enroll because it does not recognize your undergraduate coursework. The Registrar can override this block and enroll you in a 4000-level course.

Additional information is provided to MS students every semester via the group [Canvas](#) page – be sure to check this out for information about courses, as well as graduation deadlines and job opportunities.

Graduate Internship

Chem 6905 and Biol 6905 research is conducted on-campus. It is also possible to perform research off-campus and receive academic credit for Biol 6699, Graduate Internship in Biotechnology. In order to enroll in Bio 6699, you must be a student in good standing in the MS program and you must have a mentor/supervisor and a position in a research lab or in industry in the greater St. Louis region that is appropriate for a biotechnology internship. Please click [here](#) for details on the Internship and the required form to enroll in the Biotechnology internship.

Thesis MS Students

All students are admitted to the MS program as non-thesis students. To transfer to the thesis program, a student must be accepted as a thesis student by one of the faculty members from BCBT, who agrees to serve as the Research Advisor. In most cases a thesis student will be expected to enroll full-time (9 credit hours/semester). The student and advisor will work together to form a Thesis Committee, which will be officially appointed by the Graduate Dean using [Form M-2](#). The core course requirements are the same for thesis and non-thesis students. Thesis MS students may count up to 12 credit hours of Chem 6905 or Biol 6905 as elective hours in their degree program. Thesis students must write and

defend an original Thesis describing their individual research project. The Thesis must be approved by the Thesis Committee using [Form M-3](#).

Graduation Requirements.

All MS students must submit a degree program application to the Graduate School that documents that all the core courses and the 15 credit hours of elective courses have been completed with a gpa of 3.0 (calculated using all non-research courses).

The program gpa is calculated based only on the 30 credit hours of courses presented to the Graduate School to satisfy the degree requirements. If you receive a poor grade in an elective course, you can in effect remove that grade from your program gpa by taking an additional elective course and using the second course for your degree program. The BCBT program will allow you to use this procedure to replace only one 3-credit hour elective course. If you receive a poor grade in a core course, you can retake the course, and your program gpa will be calculated based on the grade you receive in the retake. The BCBT will allow you to retake only one core course. All grade replacements must be approved prior to taking the second course using [Form C5](#).

In the final semester, all students must apply for their MS degree by submitting [Form M-4](#) to the Graduate School.

Probation

The Graduate School requires a minimum overall gpa of 3.0 for a student to remain in good standing. If the cumulative gpa falls below 3.0, the student will be placed on academic probation by the Graduate

School. In most cases, a student who has been placed on probation will be allowed at least one additional semester to show improvement. However, in the case of exceptionally poor grades, a student may be dismissed immediately.

When a student is placed on probation, the BCBT program will evaluate the overall academic record and will communicate to the student the expectations for the following semester. In general, it is not necessary that a student bring the overall gpa up to 3.0 in one semester. Instead, the BCBT program expects significant improvement, so that we can see a realistic path to getting back to a 3.0 gpa. The key issue is whether a student is making significant progress toward the degree. A second consecutive semester of poor grades may result in dismissal from the program. In addition, dropping all or most classes with EX grades is not considered making significant progress. Consistent failure to complete courses may also result in dismissal from the program.

The formal process for dismissal from the BCBT program is as follows. The Program Director reviews the academic record of each student and selects the cases that appear to be problematic. The Program Director will submit each case for dismissal to the entire BCBT faculty for discussion and a formal vote. The results of the faculty vote will be forwarded to the Dean of the Graduate School in the form of a recommendation to either dismiss or retain the student. The final decision to dismiss a student is made by the Dean.

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