Student Handbook

Masters of Science degree Program

Biochemistry & Biotechnology

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

Last updated Spring 2013

View of the Science Complex across Bugg Lake.
**Biochemistry & Biotechnology (BCBT) Masters 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 Graduate School at UM-St. Louis. Note that we offer only one MS degree, which is “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).

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 a very integrated, interdisciplinary program that serves the instructional needs of the BCBT students.

**The Science Complex**

The BCBT program resides in the Science Complex. This building consists of four distinct sections. From west to east, these are the Center for Nanoscience, Benton Hall, Research Wing, and Stadler Hall. These units were constructed at different times. In the early days, Benton and Stadler Halls were separate buildings. Although all these units have now been joined into one building, the Science Complex, the sections of the Building retain their original names, so faculty and students refer to Benton and Stadler 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
Bxxx = Benton Hall
Rxxx = Research Wing
M (or N) xxx = Center for Nanosciences (CNS)

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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, particularly international students. 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 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 a course in biochemistry (equivalent to Biol/Chem 4712). Other coursework in genetics, molecular biology, and microbiology 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/](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. In effect this means that we will approve a degree program (Form M-1) that contains the new courses.

**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 lay out for one semester and resume normal registration the following semester. However, if a student fails to enroll during a calendar year, he/she will have to reapply to the Graduate School.

**BCBT Core**

The core consists of 5 required courses. Students must take Chem 4722, Advanced Biochemistry, Chem 5774, Bioinformatics, and Biol 6615, Biotechnology Lab II. A student must take either Biol 6602 or Biol 6612. If both courses are taken, 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.

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

**Required (15 credit hours):**

- 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 6612 *Advanced Molecular Genetics of Bacteria* (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 4772 *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 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 6550 *Advanced Bacterial Pathogenesis* (3 credit hours)
- Biol 6602 *Advanced Molecular Biology* (3 credit hours)
- Biol 6612 *Advanced Molecular Genetics of Bacteria* (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* (2-5 credit hours), when relevant

**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 expected rotation of courses is shown in Table 2.

Research Courses

Non-thesis students are encouraged to gain some research experience by registering Chem 6905 or Biol 6905. Enrolling in these research courses is a mechanism for receiving 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 in the appropriate section of Chem 6905 or Biol 6905. Students starting the program in the Fall of 2013 or later are required to earn a minimum of 3.0 GPA in non research courses to graduate. CHEM 6905 grades cannot be used in the program GPA calculation.
## Table 1. Biochemistry & Biotechnology Course Rotation

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<td>Chem 5794 Biological NMR</td>
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<td>Biol 6652 Adv. Virology</td>
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Special Topics Courses.

A special topics course is one in which the specific topic varies from one semester to the next. Students can repeat a special topics course as long as the topic is different each time. Currently Chem 5794 rotates through a fixed sequence of 3 topics, as listed in Table 2. A student could take Chem 5794 three times 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 Wendy Olivas (A-L)  
Office:  S404B Stadler Hall  
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Professor Bethany Zolman (M-Z)  
Office:  R428  
zolmanb@msx.umsl.edu

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.

**Graduate Internship**

The research in Chem 6905 and Biol 6905 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.

More details on the Biotechnology Internship and the form you will need to submit in order to enroll in the Biotechnology internship are provided on the BCBT website.

**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.**

Both Thesis and Non-thesis students must submit a degree program (Form M-1) to the Graduate School that documents that all the core courses and the 15 credit hours of elective courses have been completed with a program gpa of 3.0. Students starting in the Fall of 2013 or later cannot use research grades (CHEM 6905) in the program GPA calculation for graduation. A 3.0 GPA must be earned in non-research courses.

The program gpa is calculated based only on the 30 credit hours of courses presented to the Graduate School (using Form M-1, next page) to satisfy the degree requirements. Courses taken beyond the minimum degree requirements can be omitted from the courses listed on the Form M-1. 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.

In the final semester, both thesis and non-thesis students must apply for their MS degree by submitting Form M-4 to the Graduate School.
Graduate School Form M-1 (non-thesis)

UNIVERSITY OF MISSOURI-ST. LOUIS

PROGRAM FOR MASTER'S DEGREE/GRADUATE CERTIFICATE (M-1)

Name ____________________________ Student Number ____________________________

Address ____________________________ Phone ( ) ____________________________ Email ____________________________

Zip Code ____________________________

Current Degree and Major Field ____________________________

Graduate Certificate (if applicable) ____________________________

Degree and Major Field of last degree ____________________________

College(s) where transfer work done ____________________________

(only applies to this degree)

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Total credit hours in program ____________________________

Foreign language proficiency required ____________________________

Thesis ☐ Scholarly Paper ☐

Hours above5000 ____________________________

Comprehensive Exam ☐ Exit course ☐ Exit project ☐

Candidate ____________________________ Date ____________________________

Chair/Director of Graduate Studies ____________________________ Date ____________________________

Advisor ____________________________ Date ____________________________

Graduate Dean ____________________________ Date ____________________________

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**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.