

**GUIDELINES FOR A MS DEGREE
IN THE DEPARTMENT OF BIOCHEMISTRY AND MOLECULAR GENETICS
UNIVERSITY OF LOUISVILLE SCHOOL OF MEDICINE**

I. GENERAL INFORMATION

These guidelines represent the policies of the Department of Biochemistry & Molecular Genetics regarding the masters (MS) program. The MS program is administered by the Graduate Executive Committee (GEC). This committee is responsible for reviewing the progress of the students and recommending changes in the program for approval by the faculty. In addition, the Department Chair, GEC, and all members of the faculty are available to assist students in their progress towards successful completion of the M.S. degree.

Students are expected to read and be familiar with all of the policies and requirements outlined herein. These guidelines are not meant to supersede the academic policies of the University as outlined in the [Graduate School Catalog](#). Students are expected to familiarize themselves with the [Graduate School Catalog](#), the policies on academic standing, the statement of student ethics, and the requirements for obtaining graduate degrees at the University of Louisville.

II. THE GRADUATE EXECUTIVE COMMITTEE (GEC)

A. GEC is responsible for the administration of the academic program for Biochemistry and Molecular Genetics (BMG). The committee is charged with implementing changes in BMG curriculum and student policies upon request of faculty, the department Chair, or students. Any changes in the policies of the graduate program are made to reflect the current goals of the BMG Graduate Program. All changes must be approved by BMG faculty vote and the Chair.

B. Composition and Duties

1. Director of Graduate Studies: Serves as Director of GEC and manages matters pertaining to the BMG graduate program. The DGS is responsible for informing the faculty and students of policies related to the BMG graduate program and School of Interdisciplinary Graduate Studies (SIGS), and revising policies related to graduate program based upon request of faculty or department Chair. The DGS serves as an advisor for all graduate students.

2. Director of Admissions: Responsible for screening applications and presenting candidates to GEC and IPIBS for approval. Acts as the liaison between applicants and GEC.

3. Director of Curriculum and Exams: Responsible for managing and monitoring the Exam I process. Works with course directors upon request of the departmental Chair to assist in course curriculum changes. Revises policies related to curriculum and exams based on faculty input.

4. Joint Faculty Representative: Serves as the liaison between joint faculty and the BMG department. Responsible for providing input on BMG policy.

5. Student Representative: Serves as the liaison between BMG students and GEC.

The members of GEC work as a team and all have a vote.

III. FACULTY ADVISORS

A. The Director of Graduate Studies (DGS) for Biochemistry and Molecular Genetics (BMG).

The DGS will serve as the advisor for all MS students. The DGS serves as the liaison between the graduate students and the department, unit, and school. All student progress is monitored and approved by the DGS, the Graduate Executive Committee and the Chair. The DGS is responsible for approving course registration, including drop/add, each term throughout the duration of the program, and lab rotation and advisor selection requests. He/she is also responsible for notifying the School of Interdisciplinary Graduate Studies (graduate school) on student progress, e.g., MS degree

application and degree completion. It is the student's responsibility to keep the DGS informed their progress. This is best accomplished through scheduled annual advisory meetings.

B. Thesis Advisor

Students that elect to complete a thesis-based MS will need to select a laboratory and advisor. The role of the Thesis Advisor is to serve as the primary mentor for the student throughout the duration of the program. The major responsibility of the Mentor is for research training and professional development.

IV. MS Program Overview

A. The Masters Program in Biochemistry and Molecular Genetics is a 2 - 3 year course of study designed for students interested in:

1. a terminal master's degree leading to jobs that do not require extensive research experience or credentials, e.g. pharmaceutical representatives, medical insurance providers, medico-legal professionals;
2. combined programs to form hybrid or dual science/business or public health degrees, such as an M.S./M.B.A. or M.S./M.P.H. programs;
3. progressing through management ranks in Pharma or biotech businesses;
4. combining the scientific foundations with extensive scientific writing experience or electives as the basis for a scientific writing career;
5. gaining practical training in laboratory technique and analysis as the basis for a career in biotechnology or academic research.

B. Program Options.

To fulfill the diverse needs of our MS students, BMG offers three MS options:

1. Non-thesis Course-based MS
2. Non-thesis Laboratory technique based MS
3. Thesis-based MS

IV. Requirements for the MS Degree in Biochemistry

All MS students must complete 30 credit hours. This requirement can be met through coursework, seminar presentation, and research, and will depend on the program option for the student. In addition, a final summative event is required; this will be either a professional paper based on literature or laboratory research or a traditional thesis that will be evaluated by the faculty.

A. The 30 h credit requirement will be partially fulfilled by the required courses. The remaining credit hours will be selected based on the program option.

1. The selection of courses to complete the credit requirements should be made in consultation with the DGS and the student's thesis advisor (thesis option only).
2. For students with previous graduate training, documented graduate level courses may be accepted to fulfill credit requirements. This requires approval by the Graduate Executive Committee when the student is admitted.
3. Students are expected to maintain B (3.0) averages in their course work. A student who fails to maintain a B average will be placed on academic probation for one semester and will be subject to dismissal from the program after a second semester with an average below 3.0.

B. Required Courses

1. BIOC 645/ 647 (Adv. Biochemistry I and II)

2. BIOC 668 (Molecular Biology & Genetics)

C. Other Requirements

1. BIOC 630 (Responsible Conduct of Research)

All students will receive mandatory training in ethics as mandated by the NIH and the University of Louisville

2. BIOC 606 (Seminar)

This requires a formal departmental presentation. The topic is to be selected by the student and approved by the DGS in consultation with the seminar director. The student will be advised on seminar preparation.

3. Complete a summative final event. The format of the summative event depends on the MS program option.

4. Course Offerings

FALL COURSE OFFERING				
course #	course name			hr
BIOC 645	Adv Biochemistry I	Required		4
BIOC 611	Adv Techniques in BMG	Elective		4
BIOC 668	Mol Biol/Genetics	Required		4
BIOC 680	Biomolecular Interactions	Elective		2
BIOC 606	seminar	Required		1
BIOC 603	Special Topics in BMB	Elective		(1-4)
BIOC 613	Lab Rotation	Required for lab-based option		(1-4)
BIOC 619	Research	Required for thesis-based option		(1-9)
SPRING COURSE OFFERING				
course #	course name			hr
BIOC 647	Adv Biochemistry II	Required		4
BIOC 667	Cell Biology	Elective		3
BIOC 675	Cancer Biology	Elective		4
BIOC 661	Molecular Toxicology	Elective		3
BIOC 630	Responsible Conduct of Research	Required		1
BIOC 606	seminar			1
BIOC 603	Sp. Topics -Grant Writing	Elective		2
BIOC 603	Special Topics in BMB	Elective		(1-4)
BIOC 613	Lab Rotation	Required for lab-based option		(1-4)
BIOC 619	Research	Required for thesis-based option		(1-9)

V. MS Options

A. Thesis option requirements

1. Credit hours

A total of 18 h of coursework is required for the MS thesis degree. Completion of the required courses listed above (BIOC 645, 647, 668) will fulfill 12 h of coursework credit. The remaining 6 h coursework requirement can be fulfilled with electives, of which 4 credit hours must be in BIOC courses and 2 credit hours of electives inside or outside of BIOC. One semester of BIOC 611 (Advanced Techniques in BMG Methods I, 4 h) is required for a student entering the thesis-based option and who has no prior research experience.

The remaining 12 h credit requirement will be partially fulfilled with BIOC 606 and BIOC 630 (1 credit hour each), and completed with either Biochemistry lab rotation (BIOC 613), or Research (BIOC 619) hours.

2. THESIS COMMITTEE

MS thesis committees shall be composed of the advisor, two other faculty of the Department of Biochemistry and Molecular Genetics (at least two of the Committee members must be primary faculty in the Department), and one member outside of the Department, and must be approved by the Graduate Executive Committee.

Once an advisor has been selected and the research project is underway, the advisor in consultation with the student will submit to the GEC names of the faculty members willing to serve on the student's Thesis Committee. Committees must be approved by GEC, the Chair of the Department and the Dean of the Graduate School. The student will submit the Thesis/Dissertation Advisory Committee Appointment form signed by the Thesis committee to GEC for approval.

3. Committee Meetings

Students should have annual committee meetings. A *Committee Meeting Progress Report* form must be completed by the mentor after each meeting. The content of this document should summarize committee member comments and contain specific feedback for the student to know the expectations and goals to be accomplished before the next meeting. **A pdf copy of this form must be approved by all committee members and student, and the final approved form sent to the DGS from the mentor. An electronic form is sufficient and the approved meeting report should be sent to the DGS within 1 week of the committee meeting.** The completed form is placed in the student's file and serves as a record to indicate progress in graduate research.

The Thesis Committee is responsible for monitoring the student's research and professional development progress. The role of the Thesis Committee is to help advise students on their research, evaluate research progress, and approve the final thesis. The committee may recommend changes in direction of the research should they feel such changes are necessary for timely completion of a high quality thesis. Specifically, the thesis should be an original piece of research of high quality and contribute to a publishable paper in a peer reviewed journal.

The first committee meeting should be held within the first year, after the project is selected by the mentor and student. MS students must prepare a 2-3 page research proposal and submit the proposal to their thesis committee 1 week prior to the meeting. During the meeting the student will present that proposal.

4. Thesis

A MS research thesis is required for the thesis option. Students, with the consent of their committee, may choose between a traditional research thesis format or a thesis in which the methods and results sections are replaced by manuscripts ready for submission for publication in a refereed journal. In either case, the thesis must conform to the School of Interdisciplinary and Graduate Studies' Standards for Preparation of Theses and Dissertations.

B. MS non-thesis option: laboratory-based

1. Credit hours

Completion of the required courses will fulfill 12 h of coursework credit and completion of the other requirements (BIOC 606 and BIOC 630) will total 14 h credit hours. The remaining 16 h requirement can be fulfilled with one semester of BIOC 611 (Advanced Techniques in BMG Methods I, 4 h) and BIOC 613 (laboratory rotations). BIOC 611 is

required for a student entering the laboratory-based option and who has no prior research experience.

2. Laboratory rotations: Students are expected to spend the equivalent of up to 10 hours per week for 8 weeks learning laboratory techniques and approaches focusing on a research problem. At the end of the rotation, students present their work to the Department in a 15 minute research conference format. They will be expected to understand the background of the work, the specific goals of the project, and have an understanding of the methodological approaches and interpretation. A short written summary of the work is also required. The course is graded as P/F.
The MS student with a lab-based option is expected to complete 4 rotations with the goal to learn diverse laboratory techniques. Selection of the lab/preceptor will be made in consultation with the DGS and approved by GEC.

Guidelines for the rotations and report are in Appendix A

3. Summative final event
A paper based on literature research or laboratory research (rotation research) is required. The topic will be approved by the DGS and the paper evaluated by 2 faculty.

Guidelines for the paper are in Appendix A

3. MS non-thesis option: course-based

- a. Credit hours

Course requirements for students interested primarily in a course work MS include 22 credit hours of BIOC courses and 8 credit hours of electives inside or outside of BIOC. Completion of the required courses listed above (BIOC 645, 647, 667, 668, 606, and 630) will fulfill 14 h of BIOC courses. Selection from two of the following courses BIOC 680, 675, 661 will fulfill the BIOC course requirements. Laboratory work (BIOC 613) may be considered an elective to count towards the degree. The student will work with the DGS to review course enrollment and track their progression towards degree.

- b. Summative final event

A paper based on literature research is required. The topic will be approved by the DGS and the paper evaluated by 2 faculty.

Guidelines for the paper are in Appendix A

Revised July 2013

Approved by the Graduate Executive Committee

Approved by BMG Faculty

Date: 08-07-13

Date: 09-24-13

GUIDELINES FOR THE MS SUMMATIVE EVENT

THE DEPARTMENT OF BIOCHEMISTRY AND MOLECULAR GENETICS

UNIVERSITY OF LOUISVILLE SCHOOL OF MEDICINE

Requirement: A paper based on literature research. My advice is to write the paper on the topic of your seminar.

Organize your paper with the following sections:

- I. Introduction (1- 2 pages):
 - Summarize the current state of the field
 - Identify major questions within the field
 - Select one paper that addresses 1 question to critique
- II. Paper Critique (1-2 pages)
 - State the purpose of the study
 - Summarize the data (all data)
 - Select 2 key figures to discuss/critique
 - Summarize authors' conclusions
 - Present own critique of the study
 - Comment on the strengths and weaknesses
 - State own conclusions (you can agree or disagree with the authors)
- III. Discussion (1 page)
 - Address how this paper advances the field
 - Propose the next question and experiments (1-2 experiments) for this study.
- IV. References
 - Follow JBC format

- Cited in text by number and not by author, title, and/or date
- Titles should be included in references
- Numbered consecutively in the order of appearance
- References for journals and books should be in the following styles:

1. MacDonald, G.M., Steenhuis, J.J., and Barry, B.A. (1995) A difference Fourier transform infrared spectroscopic study of chlorophyll oxidation in hydroxylamine-treated photosystem II. *J. Biol. Chem.* **270**, 8420–8428

2. Sambrook, J., Fritsch, E.F., and Maniatis, T. (1989) *Molecular Cloning: A Laboratory Manual*, 2nd Ed., Cold Spring Harbor Laboratory, Cold Spring Harbor, NY

3. *References appearing as e-pubs should be in the following style:* Aphasizheva, I., Aphasizheva, R., and Simpson, L. (April 1, 2004) RNA editing terminal uridylyl transferase 1: identification of functional domains by mutational analysis. *J. Biol. Chem.* 10.1074/jbc.M401234200

Format: Arial 11 pt., 0.5 inch margins, single-spaced, include page numbers.