

A non-thesis option for the M.S. graduate program in Biochemistry and Molecular Biology

Approved by the Department of Biochemistry and Molecular Biology, and the School of Medicine Graduate Curriculum Committee, and the Graduate Council

Statement of purpose: The M.S. program in Biochemistry and Molecular Biology serves several important roles in the state of Kentucky. It is currently the only Biochemistry and Molecular Biology M.S. program in the Commonwealth with a focus on biomedical training. Our contacts in the biotechnology industry and the biomedical research community have indicated that well trained M.S. students are an invaluable resource. If the Commonwealth of Kentucky and in particular the city of Louisville is to develop biotechnology industry, it will need well-trained graduates with M.S. degrees in focused areas to provide essential personnel. The currently available M.S. thesis option in Biochemistry and Molecular Biology will fill the needs of some students. However, there are students whose needs can best be met without having to perform the research necessary for a full M.S. thesis, and who would greatly benefit from a well-designed MS curriculum with a non-thesis option. This would include for example: students who wish to obtain broad research training in biochemistry and molecular biology rather than the more narrowly focused training inherent in a research based thesis; or students with interests in advanced biochemistry/molecular biology training but who wish to pursue careers outside of laboratory research (in business or law for example). We believe we can meet the needs of such diverse student populations and graduate significant numbers of students each year. Our plan is to implement specialization areas in Biochemistry and Molecular Biology within in a non-thesis format, using essentially a two-track system. In one track, students would take a minimum of coursework, but perform four to five laboratory rotations to obtain a breadth of laboratory experience. In another track, students would take most or all of their credit hours through classroom instruction. The curriculum will be flexible enough to satisfy requirements of students with different career goals. We anticipate that these students would be tuition paying.

Resources. The M.S. program should not drain significant financial resources from current Ph.D. and M.S. training programs. The curriculum being considered utilizes existing courses or ones that can be easily modified to incorporate these students. The programs would not require stipends or tuition remissions. Students interested in the laboratory-training track would enter laboratories as rotation students, and this would require supervision by faculty and thus some faculty time. However, these students could also enhance the research productivity of the laboratories they work in by providing needed laboratory personnel.

Graduate School minimum requirements. The Graduate School Requirement for the M.S. degree is 30 credit hours, and provide for a non-thesis option by substituting a professional paper for a thesis.

MS-non-thesis Requirements

Curriculum- (Note: descriptions of individual courses are available in the graduate catalog)

| | Credit hours |
|--|--------------|
| Biochem I & II (BIOC 645 & 647) | 8 |
| Methods (BIOC 611) | 0-3 |
| Advanced BMB courses | 0-14 |
| Molecular Biology (BIOC 668 – 4cr) | |
| Advanced Eukaryotic genetics (BIOC 641-4 cr) | |
| Protein Structure & Function (BIOC 670 – 4cr) | |
| Molecular Basis of Cancer (BIOC 675 – 2cr) | |
| Molecular Endocrinology (BIOC 660 – 2 cr) | |
| Special Topics in Biochemistry (BIOC 603 1-2 cr) | |
| Outside electives ¹ | 0-14 |
| Seminar (BIOC 606) | 2 |
| Biochemistry Lab Rotations ² (BIOC 613) | 0-20 credits |

TOTAL: 10 hours of required courses + 20 elective hours **of which at least 6 must be in BIOC courses.**

¹ Elective courses outside of Biochemistry and Molecular Biology may be in any available graduate level courses approved by the Department's Graduate Executive Committee. They would include for example, available School of Medicine graduate courses in Anatomical Sciences and Neurobiology, Microbiology and Immunology, Pharmacology and Toxicology, Physiology and Biophysics, and School of Public Health and Information Sciences courses in Clinical Investigative Sciences or Biostatistics.

² The graduate school credit recommendations are for 1 credit of laboratory instruction to be equivalent to 35 hrs of lab work per semester. Thus 10 hrs per week for 14 weeks, or 20 hrs per week for 7 weeks would be the equivalent of a 4 credit-hour rotation. Students interested in laboratory training track will take 4-5 different laboratory rotations (4 credits each).

Additional requirements:

In addition to the curriculum, the program will require a comprehensive oral exam linked to an M.S. professional paper. This paper may be based on laboratory rotations, or literature review, and will be evaluated by a three-person faculty committee.

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

We anticipate that this curriculum can be completed in one and a half to two years.