

Texas Tech University Health Sciences Center Graduate School of Biomedical Sciences

Ph.D. Graduate Concentration in Molecular Biophysics

Procedures and Requirements

Last Updated: July 2020

Updates:

New course numbers for BBM, EBBM, and other courses.

All rules as outlined in the GSBS catalogue apply. In a few instances, this document defines more detailed rules that are within those of the GSBS catalogue.

1. Mission of Ph.D. Concentration

In support of the GSBS's mission of educating the next generation of health-related professionals in a dynamic and productive research environment that fosters creativity and discovery, the mission of the MB concentration is: 1) to develop each student's understanding of cellular and molecular biology, membrane biophysics, and membrane transport physiology; 2) to develop each student's ability to formulate hypotheses, design experiments and think critically and creatively, i.e., to become a highly competent, independent and ethical investigator; 3) to develop each student's ability to teach effectively in a professional curriculum; and 4) to develop each student's ability to communicate clearly and concisely with others.

2. Goals of Ph.D. Concentration

The goals of the MB Ph.D. degree concentration are to provide the student with the academic background and research expertise to facilitate his/her understanding of experimental design using state-of-the-art technology, communicate verbally and in writing with scientific colleagues, and advance scientific knowledge. Specific goals include providing the student with: 1) a broad background in the basic biomedical sciences, 2) advanced knowledge in a specific area of cell physiology and molecular biophysics; 3) the ability to identify specific research problems and formulate testable hypotheses related to these problems, and 4) the technical competence to develop new or adapt existing laboratory techniques to solve research problems. The major differences between the Ph.D. and Master's degrees are the nature and scope of the research project and the number of didactic courses. The Ph.D. degree requires original, independent research conducted under the supervision of a research mentor and seeks to develop a knowledge base for advanced research and teaching. The student is expected to reach a high level of creativity, expertise and independence that exceeds the requirements of the Master's concentration.

3. Outcome Goals for Ph.D. Graduates

The MB concentration is designed to place our Ph.D. graduates in successful postdoctoral research positions, so that upon completion of their postdoctoral training they can enter into a research-related environment in government, industry or academia, as a basic scientist or with medical training, a clinical scientist in one of the environments defined above. Another successful outcome goal of our concentration is for the graduate to become an educator in a four-year undergraduate college.

4. Required Coursework

During the fall semester the student will complete the GSBS First Year Core Curriculum courses Core I through Core IV. The students will also begin the process necessary to select a Supervising Professor in whose laboratory the dissertation research will be conducted by rotating in different laboratories (one rotation during Core V in Fall of Year 1, and two rotations during Techniques in Biomedical Research (GSBS 5098) in Spring of Year 1). The GSBS course Responsible Conduct of Research (GSBS 5101) is also required.

Additional coursework required by the MB Concentration: Biochemistry and Biophysics of Membranes (GMBP 5321), Cell Physiology and Molecular Biophysics (CPMB) MB Seminar (GMBP 7101) for all Years for the Spring and Fall semesters, Readings in MB (GMBP 7102) starting with the second Year for all Years for the Spring and Fall semesters.

Additional electives are required to reach the GSBS minimum of 48 didactic hours. The complete list of coursework for each student will be documented in the "Doctoral Degree Plan" (see below) and must be

coordinated with the Doctoral Advisory Committee and Graduate Concentration Advisor.

Courses that can be used to reach the GSBS 48 hour minimum include, but are not limited to: Introduction to Statistical Methods (GSBS 5310) or Introduction to Biostatistics (GSPH 5411), Experimental Biochemistry and Biophysics of Membranes (GMBP 5221), Advanced Cell Biology (GBCM 6320), Advanced Protein Biochemistry (GBCM 6333), Advanced Topics in MB (GMBP 6105, 6205, 6305, 7103), Biology of Cancer (GBTC 5340), Fundamental of Oral and Written Presentations (GIID 5350), Human Physiology (GMBP 5302), and other TTUHSC GSBS and TTU courses.

5. Doctoral Advisory Committee

A fully constituted permanent Doctoral Advisory Committee shall be established no later than 6 months after completion of the last rotation. The student and the Supervising Professor in consultation with the CPMB chair and one additional concentration faculty member determine a suitable Doctoral Advisory Committee, and present these choices to the Graduate Concentration Advisor, who will initiate the process of appointment of the Doctoral Advisory Committee by submitting the request to the office of the GSBS. All changes to the committee composition are to be communicated with the GSBS office through the Graduate Concentration Advisor.

For a Ph.D. degree, the Doctoral Advisory Committee should consist of at least five members, including the Supervising Professor, who serves as Chair. Additional members, possibly from other departments at TTUHSC, TTU, or other institutions, may be necessary to ensure that all areas of expertise required for advice and judgment of the research project are available. One member from outside the MB concentration is highly recommended. At least three members of the Doctoral Advisory Committee must be from the CPMB graduate faculty (primary or associate members). The remaining members may come from CPMB, other departments at TTUHSC, TTU, or other institutions.

Once appointed, the Doctoral Advisory Committee takes on day-to-day supervision of the student's training. It should meet soon after formation to determine if there are gaps in the student's basic knowledge that require additional course work. Subsequent meetings should be scheduled at least once a year to ensure adequate supervision of the research work. Minutes of the meetings should be provided to the Graduate Concentration Advisor to be placed in the student's file. These should be prepared by the Supervising Professor and signed by each member of the Doctoral Advisory Committee and the student. The Supervising Professor should ensure that any concerns or recommendations are stated explicitly and acknowledged by the student and other committee members.

6. Degree Plan

The graduate student's degree plan must be filed no later than the Spring semester of the second year using the current GSBS form "Doctoral Degree Plan":

https://student.ttuhschool.edu/graduate-school-of-biomedical-sciences/documents/forms/phd_degree_plan.pdf

This document is an agreement between the Doctoral Advisory Committee Chair, the Doctoral Advisory Committee Members, and the student. It documents the coursework required by the committee.

The MB Graduate Concentration Advisor must sign this form in order to ensure compliance with MB requirements in addition to GSBS requirements.