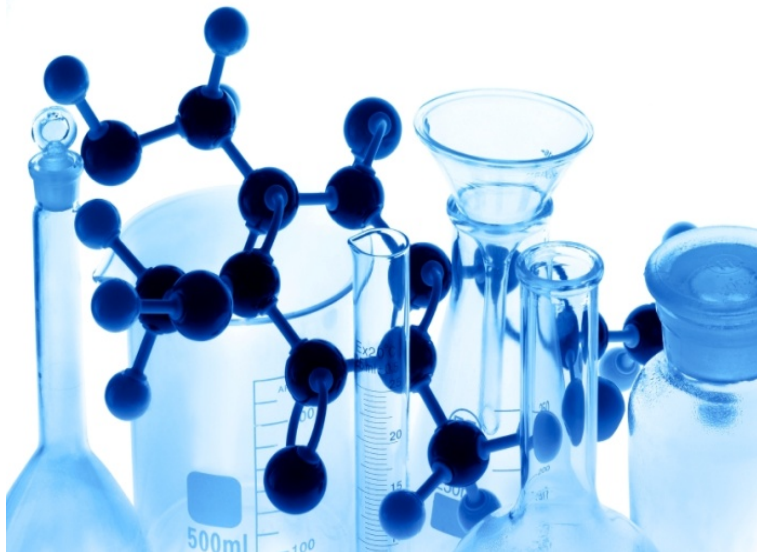


**Drexel University College of Medicine
BIOTECHNOLOGY MASTER'S PROGRAM
Policies and Procedures**



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I. INTRODUCTION

This booklet:

- describes academic policies and procedures pertaining to graduate study in the Master of Science in Biotechnology graduate program;
- supplements procedures and general rules of the Graduate School of Biomedical Sciences and Professional Studies;
- contains current guidelines that are revised periodically by faculty in the Program.

The graduate program offers coursework and research opportunities leading to an MS degree. The goal of the graduate program is to provide an intensive interdisciplinary research training and classroom experience in order to prepare graduates for significant contributions to their field. Research interests of the faculty members are described elsewhere.

II. GUIDELINES FOR MASTER OF SCIENCE PROGRAM (Non-Thesis track)

Students may enter the MS program in the non-thesis track. This track is predominately designed for individuals who may want to acquire an advanced degree so as to enhance already existing skills. For example a typical student might be an individual already working in industry or an individual wanting to learn specific laboratory skills.

A. GENERAL REQUIREMENTS

1. Students in the non-thesis Master of Science track are expected to complete their program within the three semesters.
2. The teaching requirement is waived, but opportunities for teaching are available to interested students.
3. At the end of the four practica, the student is required to write a 10-page review on one of their practica techniques. The review will be assessed by the program director and the preceptor whose specialty aligns with the topic of the review. This review will be publication quality (although publication is not required for graduation). At the discretion of the student's evaluation committee, the student may be asked to present an oral summary of the written review.
4. Students must maintain a minimum 3.0 grade-point-average to be considered in good academic standing.

B. COURSE REQUIREMENTS

- | | |
|--|---------|
| 1. IDPT 521S Core Curriculum I | 6 hours |
| 2. IDPT 526S Core Curriculum II | 4 hours |
| 3. BIOC-603S Special Topics in Biochemistry | 1 hour |
| 4. MCBG-601S-05 MCBG Seminar series | 1 hour |
| 5. BIOC-508S Experimental Approaches to Biochemical Problems | 4 hours |
| 6. IDPT 500S Scientific Integrity and Ethics | 2 hours |
| 7. Successful completion of the program will require attaining a letter grade of least "B" (3.0 GPA) in the Core Curriculum (IDPT 521S and 526S) and an overall GPA of 3.0 for the rest of the courses. Failure to meet this requirement will be grounds for dismissal from the program. | |

C. RESEARCH REQUIREMENTS

A set of 4 **hands-on practica** in which the students will get detailed exposure and experience with five different aspects of biochemistry/biotechnology. Each one will be under the close personal supervision of a faculty member with expertise in the area, and will progress from an initial set of experiments in which the results are already known (similar to laboratory courses in

college), which will allow the student to become familiar with the technique, and then progressing to a research project tightly associated with the ongoing research in the mentor's laboratory. Practica during the fall and spring semesters will be for 4 credit hours and the summer practicum will be for 8 credit hours and will include preparation of a scholarly paper that reviews a topic related to the techniques associated with that particular practicum.

Practica themes are:

1. **Laboratory Foundations** (Preceptors: Patrick Loll, PhD/Tara Davis, PhD/Shae Padrick, PhD/Todd Strochlic, VMD, PhD/Srinivas Somarowthu, PhD).

This practicum will cover the basics of working in a laboratory including commonly used techniques (pHing and buffer prep, bacterial transformation, plasmid propagation/purification, agarose gel electrophoresis, DNA/protein spectroscopy, and PCR/PCR product purification), maintaining a laboratory notebook, and correct lab etiquette. We recommend taking this practicum before any others if you do not have very much hands-on laboratory experience.

2. **Protein expression and purification** (Preceptors: Patrick Loll, PhD/Alex Mazin, PhD/Tara Davis, PhD/Shae Padrick, PhD)

This practicum covers protein expression, overproduction and purification from bacterial strains. As such this practicum will cover transformation of specialized bacterial protein expresser strains, sonication/clarification, affinity chromatography, and other various chromatography's dependent on the particular laboratory chosen (i.e., ion exchange, and size exclusion) and the level of purity of the sample required. It is recommended that you perform this practicum before taking either the crystallography or SPR practicums.

3. **Crystallography** (Preceptor: Patrick Loll, PhD/Tara Davis, PhD)

This practicum covers the sample preparation (i.e., protein purification, etc.) and crystallization of biological protein samples. This practicum does not cover structural determination from x-ray data.

4. **Gene expression and manipulation** (Preceptors: Jane Clifford, PhD/Mauricio Reginato, PhD/Todd Strochlic, VMD, PhD)

This practicum covers methodologies such as eukaryotic cell culture techniques, si/shRNA gene silencing, western blot analysis and cellular transfection. It is recommended that you take this practicum before the imaging/microscopy practicum.

5. **Protein-protein and protein-ligand interaction with SPR** (Preceptor: Simon Cocklin, PhD)

This practicum covers SPR sample preparation (i.e., protein purification), sensor chip derivatization, SPR experimental design and analysis of protein-protein interactions and/or protein-ligand interactions.

6. **Imaging/microscopy** (Preceptors: Michael Bouchard, PhD/Mauricio Reginato, PhD/Todd Strochlic, VMD, PhD)

This practicum covers methods including eukaryotic cell culture, microscopic sample slide preparation, and microscope use and image data analysis.

CODE OF BEHAVIOR

The Graduate Program in Biotechnology subscribes to the **Code of Behavior** for all of its members. This policy states that professional behavior appropriate to faculty and students in an academic research setting is expected and required at all times. Admission to and continued participation in the graduate program is therefore contingent upon the student's understanding of this policy, and his/her agreement to adhere to its guidelines.

CODE OF ETHICS

The Graduate Program in Biotechnology subscribes to the **Code of Academic Integrity** (presented in its complete form in the Student Handbook) for all its members. This policy states that cheating, plagiarism, forgery or other forms of academic misconduct are not tolerated at our institution. Admission to and continued participation in the graduate program is therefore contingent upon the student's understanding of this policy, and his/her agreement to adhere to its guidelines.

SEMINARS AND LABORATORY ROTATIONS/PRACTICA

Participation in the seminar series and successful completion of laboratory rotations/practica are considered an integral part of the education of a graduate student. Accordingly, the Biomedical Graduate Education Committee has established the following guidelines for all graduate programs:

Unsatisfactory Performance in Seminar

Three unexcused absences are allowed per year for seminars. More than three absences will result in a grade of Unsatisfactory (U). The "U" must be remediated to the satisfaction of the program. If not, it will be grounds for dismissal.

Unsatisfactory Performance in Laboratory Rotations/Practica

Laboratory rotations are graded on a Satisfactory (S) or Unsatisfactory (U) basis. Students receiving an "S" are rated on a performance scale ranging from Outstanding (1) to Poor (5). A "U" for a lab rotation is reserved for students that do not meet performance requirements, including attendance, of the rotation as stipulated by the program. A "U" for a laboratory rotation is grounds for dismissal.

**Drexel University College of Medicine
Master of Science in Biotechnology
Typical Graduate Program Schedule
Required Courses**

FALL

Meet with Dr. Simon Cocklin, Advisor to New Biotech MS Graduate Students

FALL SEMESTER I

IDPT 521S	Core Curriculum I	6 hours
BIOC-603S	Special Topics in Biochemistry	1 hour
MCBG-601S-05	MCBG Seminar Series	1 hour
	Practicum I	4 hours

SPRING

Meet with Dr. Simon Cocklin, Advisor to New Biotech MS Graduate Students

SPRING SEMESTER I

IDPT 526S	Core Curriculum II	4 hours
MCBG-601S-05	MCBG Seminar Series	1 hour
IDPT 500S	Scientific Integrity and Ethics	2 hours
	Practicum II	4 hours

SUMMER

SUMMER TERM I

	Practicum III	8 hours
	<i>Biotechnology Technique Review</i>	

FALL SEMESTER II

Meet with Dr. Simon Cocklin, Advisor to New Biotech MS Graduate Students

BIOC-508S	Experimental Approaches to Biochemical Problems	4 hours
MCBG-601S-05	MCBG Seminar Series	1 hour
	Practicum IV	4 hours