

## Molecular Biosciences Core Curriculum 2022 - 2023

### Fall

#### **16:695:538 Fundamentals of Molecular Biosciences**

6 credits

Tuesday, Wednesday, Thursday 10 a.m. to 12:00 noon

Foundational material necessary for graduate students to become fluent in the language of modern molecular and cellular biology, genetics and biochemistry in order to engage in experimentally based discovery. Through textbook and supplemental readings, instructor led lecture and discussion, students will establish the foundational knowledge base on which to build critical reasoning skills and identify open questions in molecular biosciences.

#### **16:695:539 Experimental Methods in Molecular Biosciences**

2 credits

Friday, 10 a.m. to 12:00 pm

Emphasizes experimental methodologies underlying foundational concepts in molecular biosciences. Through reading and discussion of a range of primary papers, students will become familiar with essential experimental approaches, as well as the importance of proper controls, data interpretation and quantitative methods to address problems in molecular biosciences.

#### **16:695:551 Essential Skills I**

1 credit

Monday, 10 – 12 pm.

Presents students with basic skills needed in a biological research setting. Topics range from expectations for graduate school and managing student-advisor relationships, to basic laboratory calculations, hands-on use of tools for communicating science and applications of basic statistics. Students will be introduced to tools for management of the scientific literature, including database searching for relevant papers, and how to cite references properly. Students will engage in hands on use of presentation software and bioinformatics tools. Funding opportunities and grant writing will be introduced to students, so they will be better prepared for future opportunities to submit their own fellowship applications.

#### **16:695:615 Laboratory Rotations**

2 credits

by arrangement

#### **16:695:600 Progress Reports of Graduate Students in Molecular Biosciences**

0 credits

Thursday, 4:00 p.m. – 5:00 p.m.

Students reflect on and synthesize their research progress over the previous year and practice public speaking to a broad scientific audience. Students in the audience are exposed to the array of techniques and approaches used by their colleagues, and have the opportunity to ask questions in a comfortable environment. Research presentations are delivered by students in year 2 and beyond. Each week, two students give 25-minute oral presentations with slides. Students are asked to provide context for their research project, describe their progress and future goals, and field questions from the audience.

***Total credits for fall semester: 11 credits***

## Spring

### **16:695:621-636 Mini-Courses in Molecular Biosciences**

1 credit each; select 6 for a total of 6 credits

2 days/week for 90 minutes each-days and times vary depending on course

Students will select from a collection of short courses, each spanning a period of four weeks. Two courses will be taken simultaneously in three blocks, for a total of six one-credit courses. Courses are designed to engage students in reading, analyzing and discussing the literature, giving oral or written presentations, or carrying out independent or group projects that require active participation on the part of the student. Topics will be methods-based and/or discovery-based and will cover the broad range of interests reflected by the faculty in the programs in molecular biosciences.

### **16:695:552 Essential Skills II**

1 credit

Wednesday, 11 a.m. – 12:00 noon

Continuation of Essential Skills I

### **16:115:556 Ethical Scientific Conduct**

1 credit

Monday, 4 p.m. to 5 p.m.

Discusses the definitions of and ethical problems caused by fabrication of data, falsification of results, plagiarism, and other behaviors inconsistent with ethical scientific conduct.

### **16:695:616 Laboratory Rotations**

4 credits

by arrangement

### **16:695:600 Progress Reports of Graduate Students in Molecular Biosciences**

0 credits

Thursday, 4:00 p.m. – 5:00 p.m.

Continuation; see description for fall semester

***Total credits for spring semester: 12 credits***

**Core Courses: Molecular Biosciences PhD Students Fall 2022**

Title	RU Course #	Index #	Credits	Location	Time
Fundamentals of Molecular Biosciences	16:695:538	15775	6	RWJMS Med School Room V14	Tues ,Wed, Thurs 10:00 AM -12:00 Noon
Experimental Methods in Molecular Biosciences	16:695:539	15776	2	Waks Aud	Friday 10 - 12 AM
Essential Skills I	16:695:551	15777	1	RWJMS Med School Room V12	Monday 10:00 AM – 12:00 Noon
Lab Rotation I	16:695:615	15779	3	BA	BA
Progress reports of Grad Students in Molec Biosciences	16:695:600	15778	0	Online	Thursday 4:00 PM – 5:00 PM
Total Credits:			12		

**Core Courses: Molecular Biosciences PhD Students Spring 2023**

Title	Course #	Index #	Credits	Location	Time
Mini-Courses in Molecular Biosciences	16:695:621 - 636	TBA	1 credit each, select 6 for 6 credits	TBA	Mon-Frid Check course schedule
Essential Skills II	16:695:552	TBA	1	TBA	Wednesday 11:00-12:00 Noon
Lab Rotations III	16:695:616	TBA	3	BA	BA
Ethical Scientific Conduct	16:115:556	TBA	1	TBA	Monday 4:00 PM– 5:00 PM
Progress reports of Grad Students in Molecular Biosciences	16:695:600	TBA	0	TBA	Thursday 4:00 PM – 5:00 PM
Elective of your choice					
			11		

**Members of the Laboratory Rotation and Student Advisory Committee  
(First Year Advisors)  
2022 - 2023**

Bonnie Firestein Nelson Labs, Room D411 Busch Campus (848) 445-8045 firestein@biology.rutgers.edu	Joe Fondell RWJMS Towers, Room 500A Busch Campus (732) 235-3348 fondeljd@rwjms.rutgers.edu
Jerry Langer RWJMS Towers, Room 729 Busch Campus (732) 235-5224 langer@rwjms.rutgers.edu	Karen Schindler Life Sciences Bldg, Room 222 Busch Campus (848) 445-2563 ks804@hginj.rutgers.edu
Monica Roth, Committee Chair RWJMS Towers, Room 636 Busch Campus (732) 235-5048 roth@rwjms.rutgers.edu	Vik Nanda CABM, Room 206 Busch Campus (848) 445-9810 nanda@cabm.rutgers.edu

## Mini-Courses in Molecular Biosciences

\*Offered in the spring

<b>Instructor(s)</b>	<b>Mini-Course Title</b>
Axelrod	Cancer and Clinical Oncology
Barber	Biological Clocks in Genetics, Physiology & Behavior
Hampsey	Cancer Cell Metabolism
Chada	Regeneration – All Cut Up to Be
Axelrod	Cancer Genes and Cells
Copeland	Integrated Stress Response-a paradigm for translational control
Gu/Hampsey	Eukaryotic Transcription Cycle
Gartenberg/Walworth	From Yeast Genetics to the Nobel Prize
Singson	Genetics and Cell Biology of Fertilization
Manowitz	Medical Mysteries
Peng/Welsh/Kholodovych	How to Discover Your own Drug
Junn	Molecular Basis of Neurodegeneration
Hampsey/Valvezan	Molecular Biology of Cancer
Li	Approaches to Gene Therapy
Roth	Molecular Virology: retroviruses and lentiviruses
Kwan/Margolis	Neural Circuit Microscopy
Schindler/Xiao	How to make a good egg: A Molecular Perspective
DiCicco-Bloom/Millonig	Neurodevelopmental Disorders
Gu/Zaratiegui	Noncoding Regulatory RNA
Feng/Hu	P53
Soto/Winkelmann	Optical Microscopy in Cell & Develop Biology
Zhang	Peeking into the Brain
Kwan/Verzi	Pluripotent and Somatic Stem Cells
Hamovich	Toll-Like Receptors in Health and Disease
Hampsey	The Eukaryotic RNA Polymerase transcription Cycle
Madura	Ubiquitin Proteasome in Health and Disease
Langer	Antiviral Immune Response
Langer	Early Immune Defenses Against Virusesdis
De	Applications of next-generation sequencing technologies
Berman/Lawson	Data Science & Structural Biology
Taylor	Introduction of Systems Biology
Olson	Genetic Systems & Structures
McKinnon	Stem Cell Therapy
Barr	The Cilium
Duffy	Evolution of Emerging Viruses
Haimovich	SARS-COV2 and How it Affects Humans
Axelrod	Models of Human Cancer

6/2022

*\*not all courses offered each year*

## Graduate Programs in Molecular Biosciences: Laboratory Rotations 2022 - 2023

### Purpose of Rotations

Rotations provide one of the few opportunities during your scientific career to explore different fields of science before focusing in one area. You will learn how different approaches to scientific problems and will interact with a variety of colleagues, many of whom are likely to be helpful to you later in your career. While a nine-week rotation may not be enough time to achieve a great deal in the laboratory, you are expected to put forth a reasonable effort to make the rotation experience valuable--both to you and to the laboratory. This is a time for you to evaluate the lab as a place to do your thesis work, and a time for the lab to evaluate your scientific prowess. For all these reasons, the rotations should be taken seriously while you strive to maintain a healthy balance between your course work and time in the laboratory.

### Schedule for 2022 - 2023

Students in the Graduate Programs in Molecular Biosciences are required to do three laboratory rotations, according to the following schedule:

#	Rotation Form Due	Rotation Start Date	Rotation End Date	Rotation Summary Due
1	September 23	September 26	December 2	December 9
2	December 2	December 5	February 10	February 17
3	February 10	February 13	April 14	April 21

### Setting Up Your Rotations

You have been given a list of faculty who are members of the Graduate Programs in Molecular Biosciences and are interested in taking rotation students this year. It is **your** responsibility to contact and schedule meetings with faculty members to set up your rotations. Your First Year Advisor can be very helpful as you consider your options! Once you have selected a rotation, please complete a Laboratory Rotation Form, which **must** be signed by your rotation advisor. At the end of a rotation you must complete a lab rotation form for them to sign, so your progress can be followed. Please go to the office of your advisor to obtain signatures on your rotation forms.

### General Guidelines

- You are required to take a total of 6 rotation credits, 3 in the Fall and 3 in the Spring.
- Do not set up all three rotations in the first weeks of graduate school. Focus on getting the first rotation started, then begin to explore other options as the semester progresses and you become more familiar with research opportunities on campus. Please regularly consult with your First Year Advisor as you consider your options!
- Before beginning a rotation, you must complete and submit a Lab Rotation Form (available [here](#)). The faculty member who heads the lab in which you are rotating, as well as your First Year Advisor must sign these forms (electronic signature is fine). **Forms are due the Friday before each rotation begins (see due dates above)** and should be **uploaded in the assignments section of the Lab Rotation Canvas site**.
- Upon completion of a rotation, you are required to write a one-page summary of your work in each rotation. The summary should include your name, the name of the lab, the dates of the rotation, the objectives of the work, what you did, and any results of the work. **The summary is to be presented to the Lab Head for their signature.** The student should **upload the signed summary to the assignments section of the Lab Rotation Canvas site. Summaries are due one week after the end of each rotation (see due dates above).**
- Upon completion of a rotation, the Lab Head will complete an online evaluation of your performance. These evaluations will be used by the First Year Advisors to monitor your progress in laboratory rotations.
- You should arrange your second and third rotations before the previous one ends, preferably two weeks in advance.
- You must rotate in a minimum of three labs. You cannot rotate in one lab twice!

**Upon completion of your third rotation, please notify your First Year Advisor of your selection of a thesis advisor, and complete and submit a Thesis Advisor Selection Form (available [here](#)) to the Lab Rotations Canvas site by May 1, 2023. Once you have selected a thesis laboratory, you are expected to begin your research in that laboratory!**