

# Science Research and Methodology

**Yeshiva University High School for Girls**

**Fall 2015**

Jason Williams: Instructor

Mondays 5:40-6:30, Tuesdays 5:40-7:00pm

**Objective:** This course is designed with the intention of producing thinkers first and scientists second. The fall half of the course will give a broad introduction of the skills in modern molecular biology. Students will cover basic experiments and techniques in molecular biology. As their knowledge increases, their methodological insights will be put into appropriate scientific context.

**Skills:** Students should hope to understand the following subject areas:

- Understanding of the “scientific” method
- Ability to independently design and critique experiments
- Ability to do independent research
- Awareness of current advances, and issues in science
- How to find scientific mentors and get started on summer research projects
- The basic techniques of the modern biological laboratory.

**Class Materials:** Students are expected to come prepared to each class

- Notebook or loose-leaf binder for in-class notes
- A laboratory notebook (marble notebook)

- USB thumbdrive

**Tests/Grades:** We will have quizzes monthly at the start of class. These will be posted on the calendar.

Semester grade composition:

Component	Percentage of Grade
Quizzes	20%
Homework / presentations	20%
Tests	40%
Engagement and academic ethic	20%

Extra credit – Assignments are available upon request and can replace 1 quiz grade.

**Email:** As I am part-time staff, I will use electronic mail extensively to communicate with students. Students are **expected to check their email at least weekly**, and check the website:  
[https://jasonjwilliamsny.github.io/si\\_pages/2015/2015\\_syllabus.html](https://jasonjwilliamsny.github.io/si_pages/2015/2015_syllabus.html) or  
[https://tiny.cc/si\\_2015](https://tiny.cc/si_2015) for handouts and assignments. The school provides email accounts to all students who need them.

**Questions/Absences/Class cancellations:** I will call the main office for cancellation due to weather or emergency. Please email me for anything else:  
[Williams@yuhsg.org](mailto:Williams@yuhsg.org) (Please always cc [Williams@cshl.edu](mailto:Williams@cshl.edu))

## Science Research Methodology 2015 Class schedule

## September

Date	Topic	Notes/Links
10	Orientation (5:30-6:00 PM)	<ul style="list-style-type: none"> <li>• <a href="#">At the Bench</a></li> <li>• <a href="#">What is Science - Intro reading</a></li> </ul> <p>(Tip: To download the PDFs click the 'Raw' button at the top of the page)</p>

## October

Date	Topic	Notes/Links
12/13	Laboratory Safety and Measurements	<ul style="list-style-type: none"> <li>• <a href="#">How to read an MSDS</a></li> <li>• <a href="#">Notes, week of 10/12</a></li> </ul>
19/20	(No Class) Reading and homework assignment	<ul style="list-style-type: none"> <li>• <a href="#">Notes, week of 10/19</a></li> <li>• <a href="#">Homework and quiz review</a></li> </ul>
26/27	DNA Barcoding Laboratory	<ul style="list-style-type: none"> <li>• (Quiz I – Tuesday)</li> <li>• <a href="#">Notes, week of 10/26</a></li> <li>• <a href="#">DNA Barcoding Lab Manual</a></li> </ul>

## November

Date	Topic	Notes/Links
	DNA Barcoding Bioinformatics	<ul style="list-style-type: none"> <li>• <a href="#">Homework - making pull requests</a></li> </ul>

2/3	Laboratory	<ul style="list-style-type: none"> <li>• <a href="#">Homework - Calculations Study Sheet</a></li> </ul>
9/10	Introduction to Scientific Computing	
23/24	Human Polymorphisms PCR Lab (Alu I)	(Quiz II -Tuesday)
30 – Dec1	Restriction Enzymes	

## December

Date	Topic	Notes/Links
6/7,14	School Holiday	
15	Restriction Enzymes II	
21/22	Gel Electrophoresis Laboratory	(Quiz III – Tuesday)
28/29	Scientific Computing II	

## January

Date	Topic	Notes/Links
4/5	GMO Summative Laboratory <b>No other January Classes</b> –	(Take home final)