



NATURAL SCIENCE II: MOLECULES OF LIFE

**CORE-UA 310
Fall 2015**

**Tuesday and Thursday
3:30 – 4:45 p.m.
Silver 207**

Professor Trace Jordan

**College Core Curriculum
Silver Center, Room 903B
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Office Hour: Thursday 10:30 – 11:30 a.m.

Lab Instructors

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1. Course Description

Molecules of Life explores the modern science of biological molecules, which occurs at the intersection of chemistry, biology, and medicine. The course begins by developing a foundation of chemical principles such as atoms, chemical bonding, molecular structure, and the chemistry of carbon. We then examine the wide variety of molecules and chemical reactions that exist in living cells. The next topic is DNA—the molecule of heredity—and how genetic information is processed within cells to make functional proteins with intricate molecular architectures. As the final topic we examine how enzymes function as biological catalysis and often serve as the target of pharmaceuticals. The laboratory projects throughout the semester provide an opportunity to deepen your knowledge of the course topics through activities that include hands-on experiments, building molecular models, and using computer simulations.

2. Course Objectives

As a result of this course you will.....

- Acquire foundational knowledge of the chemistry of life.
- Develop skills in representing and interpreting molecular structures, including visualization of 3D structures.
- Examine the relationship between the structure and function of biological molecules.
- Understand the methods of scientific investigation and evaluate new advances in biomolecular science as reported in the media.
- Develop effective strategies for your own learning and be an engaged participant in our class community of learners.

3. Academic Integrity

Academic integrity is the **ethical foundation** of your studies at NYU. All students in the class are required to follow the Academic Integrity policies attached to this syllabus. Any violation of these policies is a serious offense that will be reported to the Dean of your school.

4. NYU Classes Site

All course materials (announcements, homeworks, additional readings, etc.) will be available through an online learning management system called **NYU Classes**. This site can be accessed using the **ACADEMICS TAB** on your NYU Home page and it is called:

Natural Science II: Molecules of Life (Fall 2015)

5. Course Readings and Materials

Textbook

There is no commercially available textbook that is suitable for the course, so I will provide you with chapters of a text that is currently in development. Chapters from this text will be posted to the NYU Classes site for the course. You should read this material just as you would a regular text. **Please complete the assigned chapter BEFORE the corresponding class session.**

The Double Helix

James D. Watson, *The Double Helix: A Personal Account of the Discovery of the Structure of DNA* (Touchstone, 2001).

This book provides a first-hand account of the discovery of the DNA double helix. You will read the book throughout the semester and it will be used for an assignment during the course module on DNA and genetic information.

Laboratory Manual

The **laboratory manual** for the course will be used as the primary resource for all lab projects. This manual is available at the NYU Bookstore.

Additional Materials

During the semester I will provide **additional readings, websites, and videos** that expand upon the course topics. These materials will be available in a folder on the NYU Classes site for the course.

To keep up-to-date with cutting-edge developments in science and medicine, I am also assigning *The New York Times* as **recommended reading**. I will provide links to relevant articles and I encourage you to send me any interesting articles that you find when reading the *Times* yourself.

6. Grade Components

The grade components are listed below. 65% of your course grade will be based on the exams (two midterms and a cumulative final). The other 35% will be based on work that you complete throughout the semester (lab projects, homework, and in-class exercises).

Midterm Exam 1	20 %
Midterm Exam 2	20 %
Final Exam (cumulative)	25 %
Laboratory	20 %
Homework	10 %
In-Class Exercises	5 %

Course grades are calculated as the **weighted average of all the course components**. The following grading scheme will be used for exams and course grades unless otherwise announced.

A / A-	B+ / B / B-	C+ / C / C-	D+ / D	F
	B+ 87 – 89 %	C+ 77 – 79 %	D+ 65 – 69 %	F below 60%
A 95 – 100%	B 83 – 86 %	C 73 – 76 %	D 60 – 64 %	
A- 90 – 94 %	B- 80 – 82 %	C- 70 – 72 %		

7. Lecture and Laboratory Schedule (REVISED)

	<i>Date</i>	<i>Class Topic</i>	<i>Reading</i>	<i>Laboratory Project</i>
1	Th Sept 3	Course Introduction		
	<i>M Sept 7</i>			<i>No lab – Labor Day</i>
2	Tu Sept 8	Antibiotics and Resistance	Ch. 1	
		FROM ATOMS TO MOLECULES		
3	Th Sept 10	Elements of Life and Death (1)	Ch. 2	
	<i>M Sept 14</i>			<i>Lab 1: Bacteria & Antibiotics (1)</i>
4	Tu Sept 15	Elements of Life and Death (2)	Ch. 2	
5	Th Sept 17	Chemical Bonding (1)	Ch. 3	
	<i>M Sept 21</i>			<i>Lab 2: Bacteria & Antibiotics (2)</i>
6	Tu Sept 22	Chemical Bonding (2)	Ch. 3	
7	Th Sept 24	Carbon – The Element of Life (1)	Ch. 4	
	<i>M Sept 28</i>			<i>Lab 3: Molecular Structure</i>
8	Tu Sept 29	Carbon – The Element of Life (2)	Ch. 4	
9	Th Oct 1	Molecular Diversity (1)	Ch. 5	
	<i>M Oct 5</i>			<i>Review for Midterm 1</i>
10	Tu Oct 6	Molecular Diversity (2)	Ch. 5	
	Th Oct 8	Midterm Exam 1		
	<i>M Oct 12</i>			<i>No lab – Fall Recess</i>
	<i>T Oct 13</i>	<i>Legislative Day – No class or lab</i>		
		MAKING MOLECULES		
11	Th Oct 15	Chemical Reactions (1)	Ch. 6	
	<i>M Oct 19</i>			<i>Lab 4: Energy Content of Foods</i>
12	Tu Oct 20	Chemical Reactions (2)	Ch. 6	
13	Th Oct 22	Chemical Reactions (3)	Ch. 6	
	<i>M Oct 26</i>			<i>Lab 5: Monomers and Polymers</i>
14	Tu Oct 27	Monomers and Polymers (1)	Ch. 7	
15	Th Oct 29	Monomers and Polymers (2)	Ch. 7	
	<i>M Nov 2</i>			<i>Lab 6: NOVA DVD</i>
		DNA & GENETIC INFORMATION		
16	Tu Nov 3	DNA: The Molecule of Heredity (1)	Ch. 12	
17	Th Nov 5	DNA: The Molecule of Heredity (2)	Ch. 12	
	<i>M Nov 9</i>			<i>Lab 7: Studying DNA</i>
18	Tu Nov 10	From DNA to Proteins (1)	Ch. 13	
19	Th Nov 12	From DNA to Proteins (2)	Ch. 13	
	<i>M Nov 16</i>			<i>Review for Midterm 2</i>
20	T Nov 17	Case Study	TBA	
	Th Nov 19	Midterm Exam 2		
	<i>M Nov 23</i>			<i>Lab 8: Sickle Cell Anemia</i>

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ENZYMES & DRUG DEVELOPMENT				
21	Tu Nov 24	Enzymes as Biological Catalysts (1)	Ch. 14	
	Th Nov 26	No Class - Thanksgiving		
	M Nov 30			Lab 9: Enzyme Activity - Catalase
22	Tu Dec 1	Enzymes as Biological Catalysts (2)	Ch. 14	
23	Th Dec 3	Drug Development (1)	Ch. 15	
	M Dec 7			Student Presentations
24	Tu Dec 8	Drug Development (2)	Ch. 15	
25	Th Dec 10	Case Study	TBA	
	M Dec 14			Review for Final Exam
26	T Dec 15	Course Summary		
	Th Dec 17	Final Exam (4:00 – 5:50 p.m.)		

8. Religious Holidays

University policy allows students to observe a religious holiday without any academic penalty. For lectures that coincide with a religious holiday, I will post complete notes to the NYU Classes site. If you will miss a lab because of a religious holiday, we encourage you to attend another lab section if possible. You can make these arrangements with the lab instructors. If this option is not possible, **please notify your lab instructor and complete a lab absence form.** We will not count the missed lab as part of your lab grade.

9. Laboratory Sessions

You must be registered in a laboratory section in order to receive credit for the course. The sections have a capacity of **20 students**. The section enrollment cannot be increased due to safety issues and the availability of laboratory equipment. If you are not appropriately registered for a laboratory section by Lab #2, you will need to **drop the course**.

The laboratory sessions will be held in **Silver 201** and will begin on **September 14**. There are **no lab sessions during the first full week of classes.**

Lab Section	Day and Time	Lab Instructor
002	Monday 9:00 a.m. – 10:40 a.m.	Anna Powers
003	Monday 11:00 a.m. – 12:40 p.m.	Anna Powers
004	Monday 1:00 p.m. – 2:40 p.m.	Anna Powers
005	Monday 3:00 p.m. – 4:40 p.m.	Jennifer Lee
006	Monday 5:00 p.m. – 6:40 p.m.	Jennifer Lee

The laboratory exercises have been designed to expand upon topics in the lectures and to provide you with the opportunity to become skilled at molecular recognition, scientific observation, and data interpretation. Each weekly assignment is worth **50 points**, with the following breakdown:

Attendance Credit (10 points)

You are expected to arrive punctually for the beginning of the lab session and arriving more than **10 minutes late** will result in a loss of attendance credit for the session.

Laboratory Quiz (10 points)

Most laboratory sessions will begin with a short quiz. Quiz questions will be based on the **introduction** to the experiment in the lab manual, which you should read carefully before attending the laboratory session. **Arriving more than 10 minutes late for the lab will disqualify you from taking the quiz.**

Laboratory Assignment (30 points)

This assignment should be completed and submitted during the laboratory period by working collaboratively with your laboratory partner. Some laboratories may have a take-home component.

You will be at a disadvantage in the course if you miss any of the laboratory sessions. If you cannot attend a lab session because of illness, a religious holiday, etc. **you must notify your lab instructor by e-mail before the start of the session.**

If you wish to be considered for an excused absence, you must complete the lab absence form that is posted on the NYU Classes site. On this form you will be asked to provide details about the lab section that you missed and the reason for your absence. All requests for an excused absence for a **medical reason** must be documented by **attaching a doctor's note.**

The lab absence form must be submitted to Professor Jordan **within one week** of the missed lab session. The form can be submitted in class or delivered to the MAP Office (Silver 903). Any **unexcused lab absence** will count as a **zero** for your lab score for the course.

Excessive absences from the lab will result in you failing the course.

10. Student Presentation

The laboratory sessions on **December 7** will be devoted to group presentations on topics that are related to the course material. Further details will be provided during the semester.

11. Exam Format and Policies

The exams will contain questions drawn from the **classes, readings, and laboratory projects.** The questions will have several different formats – multiple choice, short answer, molecular drawings, and applying your knowledge to new examples. The final exam is **cumulative** and will cover topics from throughout the entire course.

Study questions for the lecture topics and lab projects will be posted after each class. **Homework assignments** provide valuable practice with topics that will appear on the exams.

If you will miss one midterm exam because of illness, you must contact Professor Jordan by e-mail **before the start of the exam.** **No make-up exams** will be given for this course. Instead, the final exam will count as **45% of your course total.** Since the final is cumulative, this option is not advisable unless extreme circumstances prevail. If you miss **both** midterm exams then you must withdraw from the course.

The final exam is scheduled on **Thursday, December 17, from 4:00 – 5:50 p.m.** This day and time is assigned by the NYU Registrar's Office and **no alternative date will be offered.**

A make-up will be given for the final exam only under **exceptional circumstances** that must be discussed with Professor Jordan prior to the exam. In the rare cases where approval is granted, a grade of **incomplete** will be given for the course and the make-up will be scheduled for the Spring 2016 semester. Please note that students who take a make-up final exam typically score **lower than the average** for the regularly scheduled exam, so this option is **not recommended** unless extreme circumstances are involved.

11. Homework Format and Policies

Homework assignments will contain questions that review and expand the course material. Some assignments may require you to analyze news reports in the media and/or access information on relevant web sites. The homework assignment will contain several questions, of which **two will be graded**. Each assignment is worth **10 points**, with up to **4 points for each graded question** and **2 points awarded for completing all the questions**. One homework will be an essay based on the course material.

Homeworks will be collected at the **beginning of the class** corresponding to the **due date**. Any homework submitted **after this time** will be counted as **late** and is subject to a **late penalty**. If you miss class due to an illness or other legitimate absence, you are still required to complete the homework assignment. Contact your laboratory instructor to arrange a suitable deadline for submitting the work.

12. In-Class Exercises

In-class exercises will be given regularly throughout the semester to help you develop your knowledge and skills. For some assignments you will work **individually** and for other assignments you will work in a **group**. Full credit is given for your **best effort** at answering the assigned questions. These in-class exercises are designed to be completed **during the class in which they are given**.

A maximum of **three make-ups** will be allowed during the semester. Each make-up assignment must be completed within **one week** of the original date of the assignment. Make-up assignments must be submitted on the assignment sheet. Any other sheets of paper will not be accepted as a make-up.

Completing the in-class exercises reflects your class attendance and your investment of effort in the course. **If your course grade is on the borderline** between two letter grades, the total score for your in-class exercises will be used to decide whether you deserve the higher grade.

13. Use of Electronic Devices During Class Periods

Computers have become a valuable tool for learning and many of you may want to use a laptop or tablet during class to read the posted notes and/or write your own notes. Using these devices in class for the purpose of helping you learn is completely appropriate.

By contrast, **inappropriate use** of electronic devices during class has a negative effect on your own learning, it distracts other students around you, and it is disrespectful to the course instructor. It goes against one of the learning goals for the course, which is to “be an engaged participant in our class community of learners.”

Consequently, **it is not appropriate or permitted to use computers during class for activities that are not related to the course (e.g., Facebook, shopping, etc.). It is also not appropriate or permitted to use your cell phone during class (texting, going online, etc.)**. You do not need to have your cell phone accessible during class, so please put it away.

14. Resources

At some point in the semester you may need some help for an academic, health, or wellness issue. NYU provides excellent support resources and I encourage you to use of them.

University Learning Center www.nyu.edu/ulc

The University Learning Center provides free tutoring services and workshops on general study skills. Visit the website for the schedule of tutoring and workshops.

NYU Wellness Exchange www.nyu.edu/life/safety-health-wellness/wellness-exchange.html

The NYU Wellness Exchange provides an access portal for the university's health resources, including mental health services.