Instructor Information
- Tania Lupoli, Dept. of Chemistry
- Office: Silver Building, Room 703
- Office hours: Wednesdays 3:30 – 4:30 pm or by appointment
- Email: tj1229@nyu.edu

Topics of the Course
This one-semester course is suitable for graduate students and upper-level undergraduates with a background in Chemistry and Biochemistry. We will discuss advanced topics in biochemistry and recent applications in the field. Topics will include the following: synthesis of biomolecules and their structures, molecular recognition, protein folding, catalysis, cooperativity and allostery, cell envelope structure, biologically active small molecules, and up-to-date biochemical laboratory techniques. Classic and current journal articles will be assigned and discussed during lectures to highlight important publications and modern approaches for understanding biological chemistry.

Course Requirements:
In addition to problem sets and exams, your grade will also be based on an original scientific research proposal and presentation at the end of the semester and an assigned literature presentation during the semester. One of the aims of this course is to improve your ability to read and understand scientific articles (both inside and outside of your field) and to write scientific proposals. These skills will help prepare you for careers in science.

Project. The end of semester project is a 4-5-page written proposal in the form of an NIH-style grant. Your proposal should involve a novel idea to approach an unsolved problem or an improvement to an existing methodology in the field of biochemistry (especially with a focus on structure-function relationships). Grading will be based on the originality of the idea, quality of written proposal, effectiveness at presenting your proposed research, and will be evaluated, in part, by a graduate student panel. The proposal and presentation will be submitted via NYU Classes.

Coursework and Grading:
- Midterm Exam 25%
- Final Exam 25%
- Problem Sets 20% (distributed throughout the semester)
- Project and Presentation 20% (end of semester)
- Class Participation 10% (based mainly on literature discussion and presentations)
**Attendance:**
Attendance and participation during lectures is required. You will be permitted 1 unexcused absence in all. Absences will be excused only if you have notified your me by email in advance of the lecture you will miss. Failure to present a literature topic will result in a grade of 0 for class participation.

There will be no alternative exam dates. If you cannot take an exam at the indicated date, you must inform me within the first week of the semester.

**Course Schedule (tentative):**

<table>
<thead>
<tr>
<th>Week/Date</th>
<th>Topics</th>
</tr>
</thead>
</table>
| 1: Sep 4  | Introduction & Overview  
|           | Intermolecular Interactions |
| 2: Sep 9,11 | Nucleic Acid Structure/Central Dogma  
|           | Replication |
| 3: Sep 16,18 | Transcription and Translation  
|           | (Amino Acid Structure and the Ribosome)  
|           | (Cloning/nucleic acid quantification) |
| 4: Sep 23, 25 | Peptide Analysis, Protein Structure  
|           | Protein Folding and Dynamics; Chaperones  
|           | *Guest lecture (GE Healthcare): Protein Purification Protocols* |
| 5: Sep 30, Oct 1 | Protein Degradation Machinery/Intro to Enzymes  
|           | Enzymes and Catalysis |
| 6: Oct 7, 9 | Lipids, Membranes and Compartments; Membrane Proteins  
|           | Protein Ion Channels and Pores |
| 7: Oct 14  | **NO CLASSES on Oct. 14th, meet on the 15th**  
| Oct 15     | Carbohydrates & Glycochemistry  
| Oct 16     | **MIDTERM** |
| 8: Oct 21, 23 | Molecular Recognition & Specificity  
|           | Protein-protein Interactions |
| 9: Oct 28, 30 | Allostery and Cooperativity  
|           | Proteins (Chaperones) as Drug Targets |
| 10: Nov 4, 6 | Biosynthesis of Small Molecules (NRPS/PKS) |
| 11: Nov 11  | Antibiotics; Microbiome; Host-Pathogen Molecular Interactions Recognition of  
| Nov 13     | Prof. Nate Traaseth, *Structural Biology Using NMR* |
| 12: Nov 18  | ORIGINAL PROPOSAL TOPIC DUE (on NYU classes)  
| Nov 18, 20 | Post-translational Modifications/Cell signaling  
|           | DNA/RNA, Control of Gene Expression (RNAi/CRISPR) |
| 13: Nov 25  | Prof. Kent Kirshenbaum, guest lecture, *Biochemistry in Food Science*  
| Nov 27     | **NO CLASSES** |
| 14: Dec 2   | Prof. Bobby Arora, guest lecture, *Targeting Protein-Protein Interactions*  
| Dec 4      | **FINAL EXAM** |
| Dec 7      | ORIGINAL PROPOSAL DUE (midnight on NYU Classes)  
| Dec 8      | PROPOSAL PRESENTATION FILE DUE (midnight on NYU Classes) |
| 15: Dec 9, 11 | Student presentations of final projects |
Course Materials

Textbooks:

Required: The Molecules of Life, Kuriyan, Konforti, Wemmer

Recommended: Lehninger Principles of Biochemistry, 7th Ed. by Nelson & Cox, (Macmillan). (Other editions are acceptable, too)

Resources

- Access your course materials: NYU Classes (nyu.edu/its/classes)
- Databases, journal articles, and more: Bobst Library (library.nyu.edu)
- Assistance with strengthening your writing: NYU Writing Center (nyu.mywconline.com)
- Obtain 24/7 technology assistance: IT Help Desk (nyu.edu/it/servicedesk)

Disability Disclosure Statement

Academic accommodations are available for students with disabilities. Please contact the Moses Center for Students with Disabilities (212-998-4980 or mosescsd@nyu.edu) for further information. Students who are requesting academic accommodations are advised to reach out to the Moses Center as early as possible in the semester for assistance